

# Desert

MAGAZINE OF THE SOUTHWEST

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# Desert

MAGAZINE

Volume 39, Number 1

JANUARY 1976

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## A Peek in the Publisher's Poke

**M**OTIVATION IS the name of the game in the magazine world and the readership should respond to both the editorial and advertising messages. This was made graphically clear when the last issue featured an article on golden chia entitled, "A Seed Worth Its Weight in Gold!" The response was incredible!

Mr. Harrison Doyle, the author, stated he had some seeds for sale, but no address was given. Our offices were flooded with letters requesting this information. However, Harrison does have a classified ad in our Trading Post section under "Seeds and Plants," and he began receiving as many as 100 letters a day! He is overwhelmed and personally brought by some harvested seed buttons to display in our Book Shop.

This month our featured Western Artist is Clarence Thorpe, of Riverside, California. His pastel renditions of "Cowpoke" on the cover and "Chief Hollow Horn Bear" on the back cover, plus "Corn Ceremony" on the inside are fine samples of his artistry. George Service, of Palm Desert, California, provided the photography for one of our most colorful issues.

Colorful and diverse, which is the name of our game.

How about an archeological detective story? Ever hear of kayaking on the desert? Want to take an 1860 stagecoach trip from St. Louis to Tucson? Maybe a four-wheel-drive guided tour to the heart of the Canyonlands? Ever wonder what makes a Great Basin Pocket Mouse tick? Want to know what happens when special interest groups team up for a common cause? Last, but not least, everything comes up roses, chalcedony roses, that is.

And that's how it is in *Desert*, January 1976.

Have a good year!

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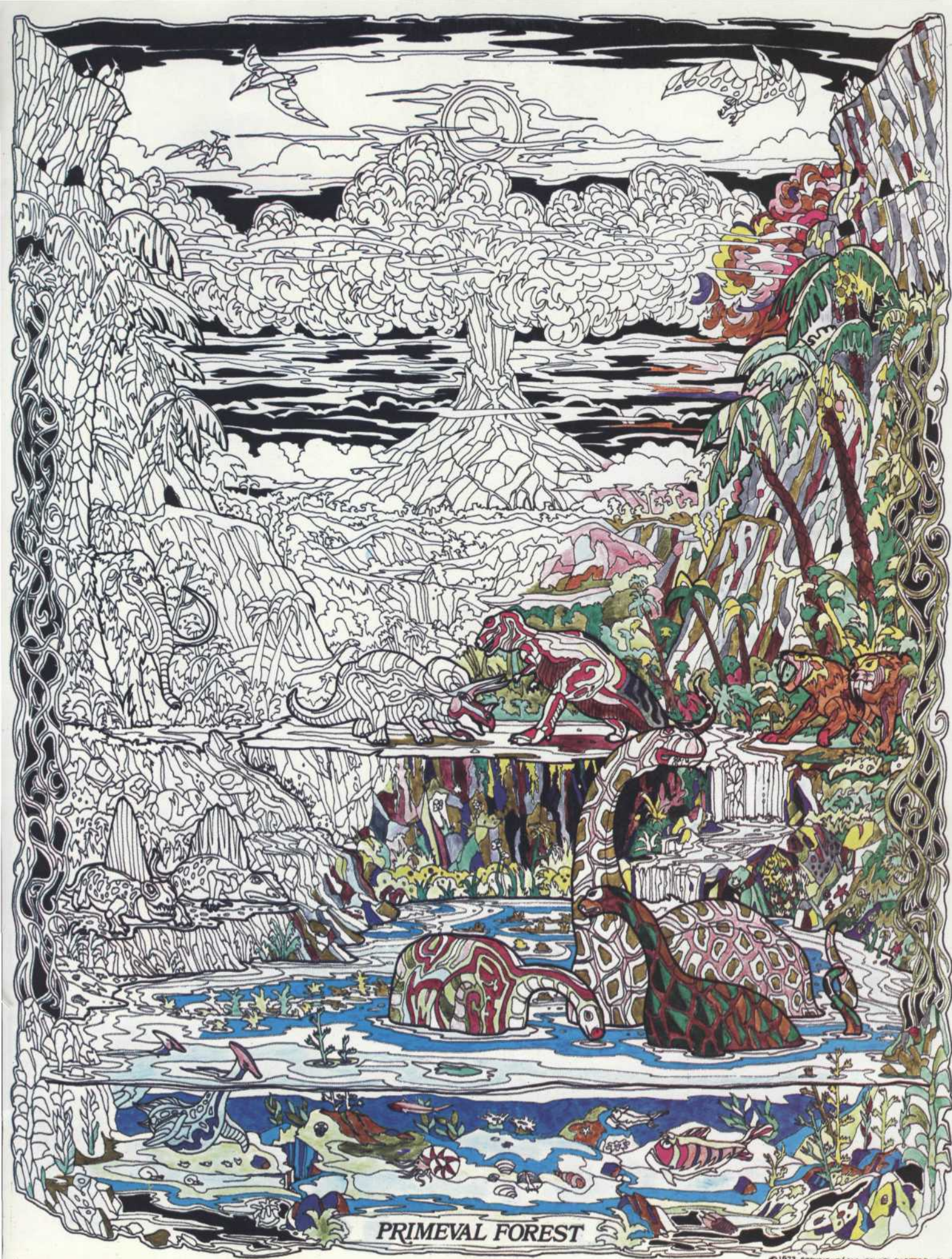
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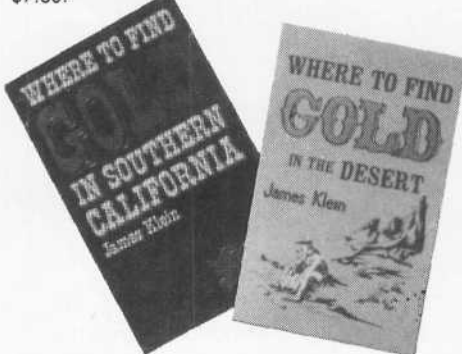
# BOOKS OF

**GHOST TOWNS OF ARIZONA** by James and Barbara Sherman. If you are looking for a ghost town in Arizona this is your waybill. Illustrated, maps, townships, range, co-ordinates, history, and other details make this one of the best ghost town books ever published. Large 9x11 format, heavy paperback, 208 pages, \$4.95.

**OUTDOOR SURVIVAL SKILLS** by Larry Dean Olsen. This book had to be lived before it could be written. The author's mastery of primitive skills has made him confident that survival living need not be an ordeal once a person has learned to adjust. Chapters deal with building shelters, making fires, finding water, use of plants for food and medication. Buckram cover, well illustrated, 188 pages, revised edition boasts of 96 4-color photos added. \$4.95.

**HISTORICAL ATLAS OF CALIFORNIA** by Warren A. Beck and Ynez D. Haase. Extensive documentation and pertinent detail make this atlas a valuable aid to the student, scholar and everyone interested in the Golden State. 101 excellent maps present information on the major faults, early Spanish explorations, Mexican land grants, route to gold fields, the Butterfield and Pony Express routes, CCC camps, World War II Installations, etc. Hardcover, extensive index, highly recommended, \$9.95.

**LOST MINES OF THE GREAT SOUTHWEST** by John D. Mitchell. The first of Mitchell's lost mine books is now available after having been out of print or years. Reproduced from the original copy and containing 54 articles based on accounts from people Mitchell interviewed. He spent his entire adult life investigating reports and legends of lost mines and treasures of the Southwest. Hardcover, illustrated, 175 pages, \$7.50.



**WHERE TO FIND GOLD IN SOUTHERN CALIFORNIA** by James Klein. Pinpoints areas around the Los Angeles basin such as San Gabriel Canyon, Lytle Creek and Orange County. Tips on how to find gold, equipment needed and how to stake a claim are included as well as the lost treasure tales of each area. Paperback, illustrated, 95 pages, \$4.95.

**WHERE TO FIND GOLD IN THE DESERT** by James Klein is a sequel to *Where to Find Gold in Southern California*. Author Klein includes lost treasure tales and gem locations as he tells where to find gold in the Rosmond-Mohave area, the El Paso Mountains, Randsburg and Barstow areas, and many more. Paperback, 112 pages, \$4.95.

**LAND OF POCO TIEMPO** by Charles F. Lummis. A reprint of the famous writer and historian of his adventures among the Indians of New Mexico. Lummis was one of the foremost writers of the West. Paperback, 236 pages, \$2.95.

**GOLD RUSHES AND MINING CAMPS OF THE EARLY AMERICAN WEST** by Vardis Fisher and Opal Laurel Holmes. Few are better prepared than Vardis Fisher to write of the gold rushes and mining camps of the West. He brings together all the men and women, all the fascinating ingredients, all the violent contrasts which go to make up one of the most enthralling chapters in American history. 300 illustrations from photographs. Large format, hardcover, boxed, 466 pages, highly recommended. \$17.95.

**HOW TO DO PERMANENT SANDPAINTING** by David and Jean Villenor. Instructions for the permanent adaptation of this age old ephemeral art of the Indians of the Greater Southwest is given including where to find the materials, preparation, how to color sand artificially, making and transferring patterns, etc. Also gives descriptions and meanings of the various Indian signs used. Well illustrated, 34 pages, \$2.50.

**THE CALIFORNIA DESERTS** by Edmund C. Jaeger. Revised 4th edition is a standard guide to Mohave and Colorado deserts with new chapters on desert conservation and aborigines. Hardcover, \$4.95.



**TURQUOISE, The Gem of the Centuries** by Oscar T. Branson. The most complete and lavishly illustrated all color book on turquoise. Identifies 43 localities, treated and stabilized material, gives brief history of the gem and details the individual techniques of the Southwest Indian Tribes. Heavy paperback, large format, 68 pages, \$7.95.

**THE BAJA BOOK, A Complete Map-Guide to Today's Baja California** by Tom Miller and Elmar Baxter. Waiting until the new transpeninsular highway opened, the authors have pooled their knowledge to give every minute detail on gas stations, campgrounds, beaches, trailer parks, road conditions, boating, surfing, flying, fishing, beachcombing, in addition to a Baja Roadlog which has been broken into convenient two-mile segments. A tremendous package for every kind of recreationist. Paperback, 178 pages, illus., maps, \$7.95.

**DESERT PLANTS AND PEOPLE** by Sam Hicks. Tells how primitive desert dwellers find sustenance, shelter, beverages and healing medicines in nature. Hardcover, \$6.95.

**GHOST TOWN ALBUM** by Lambert Florin. Over 200 photos. Fascinating pictorial accounts of the gold mining towns of the Old West—and the men who worked them. Large format. 184 pages, profusely illustrated, originally published at \$12.50, new edition \$4.95.

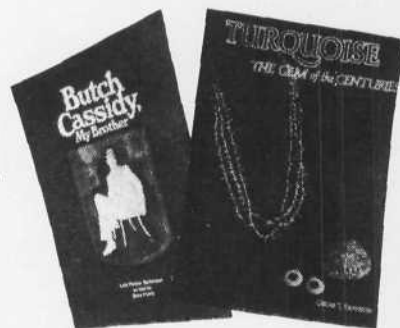
**INSIDE DEATH VALLEY** by Chuck Gebhardt. A guide and reference text of forever mysterious Death Valley, containing over 80 photographs, many in color. Included, too, are Entry Guides and Place Name Index for the convenience of visitors. Written with authority by an avid hiker, backpacker and rockclimber. 160 pages, paperback, \$4.95.

**OUR HISTORIC DESERT, The Story of the Anza-Borrego State Park.** Text by Diana Lindsay, Edited by Richard Pourade. The largest state park in the United States, this book presents a concise and cogent history of the things which have made this desert unique. The author details the geologic beginning and traces the history from Juan Bautista de Anza and early-day settlers, through to the existence today of the huge park. Hardcover, 144 pages, beautifully illustrated, \$9.50.

**BUTCH CASSIDY, My Brother** by Lula Parker Betenson. Official version of the authentic life story of Butch Cassidy, actually Robert Leroy Parker, famed outlaw of his native Utah and adjoining states, told by his surviving sister. The book also offers a new look at Utah Mormon history by a participant. Hardcover, many rare pictures, 265 pages, \$7.95.

**JEEP TRAILS TO COLORADO GHOST TOWNS** by Robert L. Brown. An illustrated, detailed, informal history of life in the mining camps deep in the almost inaccessible mountain fastness of the Colorado Rockies. 58 towns are included as examples of the vigorous struggle for existence in the mining camps of the West. 239 pages, illustrated, end sheet map, hardcover, \$7.95.

**GOLD GAMBLE** by Roberta Starry. Lavishly illustrated with old photos, the text recounts the vivid memories of the gold mining boom in California's Rand Mining District. Large format, excellent index, 167 pages, \$4.25.



**TREASURE UNDER YOUR FEET** by Roy Volker and Dick Richmond is a 126-page handbook on metal detecting that offers a short course on everything one should know about searching out and recovering buried or hidden valuables. Tells how to select and use metal detectors. Paperback, well illustrated, \$3.95.

**FOUR WHEEL DRIVE HANDBOOK** by James T. Crow and Cameron Warren. Packed into this volume is material gathered from actual experience and presented in a detailed manner so it can easily be followed and understood. Highly recommended for anyone interested in back country driving. Paper, illus., 96 pages, \$2.95.

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# THE WEST

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**GOLDEN CHIA**, by Harrison Doyle. This book illustrates the great difference between the high desert chia, and the Mexican variety presently sold in the health food stores. It identifies the energy-factor, a little-known trace mineral found only in the high desert seeds. Also includes a section on vitamins, minerals, proteins, enzymes, etc., needed for good nutrition. Referred to as "the only reference book in America on this ancient Indian energy food." 100 pages, illustrated, Paperback, \$4.75; Cloth Cover, \$7.75.

**A FIELD GUIDE TO INSECTS of America North of Mexico** by Donald J. Borror and Richard E. White. This is the most comprehensive, authoritative and up-to-date guide to North America insects ever published. It covers 579 families of insects and has more than 1300 line drawings and 142 color plates. Hardcover, 372 pages, glossary, references, \$6.95.

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**DICTIONARY OF PREHISTORIC INDIAN ARTIFACTS OF THE AMERICAN SOUTHWEST** by Franklin Barnett. A highly informative book that both illustrates and describes Indian artifacts of the Southwest, it is a valuable guide for the person interested in archaeology and anthropology. Includes 250 major types of artifacts. Each item has a photo and definition. Paperback, 130 pages, beautifully illustrated, \$7.95.



**BACK ROADS OF CALIFORNIA** by Earl Tholander and the Editors of Sunset Books. Early stagecoach routes, missions, remote canyons, old prospector cabins, mines, cemeteries, etc., are visited as the author travels and sketches the California Backroads. Through maps and notes, the traveler is invited to get off the freeways and see the rural and country lanes throughout the state. Hardcover, large format, unusually beautiful illustrations, 207 pages, \$10.95.

**BIG RED: A WILD STALLION** by Rutherford Montgomery. There was a time when there were many wild horse herds on our western ranges. These herds, jealously guarded by the stallion that had won them, met with real trouble when the hunters found they could get good prices for them from meat processors. **Big Red** tells how one stallion successfully defends his herd from both animal and human enemies. Illustrated, hardcover, 163 pages, \$4.95.

**GHOST TOWNS OF THE NORTHWEST** by Norman D. Weis. The ghost-town country of the Pacific Northwest including trips to many little-known areas, is explored in this first-hand factual and interesting book. Excellent photography. Best book to date on ghost towns of the Northwest. Maps, hardcover, heavy slick paper, 319 pages, \$7.95.

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**BEACHES OF BAJA** by Walt Wheelock. Beaches on the Pacific side of Lower California are described by the veteran Baja explorer. Unlike California beaches, they are still relatively free of crowds. Paperback, illus., 72 pages, \$1.95.

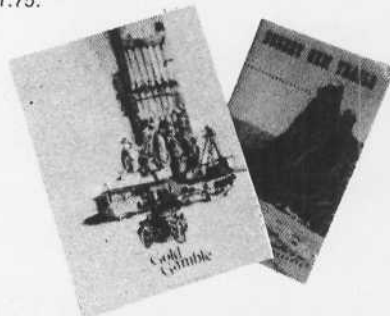
**DESERT WILD FLOWERS** by Edmund C. Jaeger. One of the most complete works ever published on flora of the Southwestern deserts. Easily understood by amateur botanists and travelers as it is informative to the professional. 322 pages, well illustrated, \$2.95.

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**WEATHER IN THE WEST** by Bette Roda Anderson, is a layman's book covering the fundamentals of weather. Contains incomparable color and black and white photos. An unusual and valuable library addition. Hardcover, large format, 223 pages, copiously illustrated, \$18.95.

**PHOTO ALBUM OF YESTERDAY'S SOUTHWEST** compiled by Charles Shelton. Early days photo collection dating from 1860s to 1910 shows prospectors, miners, cowboys, desperados and ordinary people. 195 photos, hardcover, fine gift item, \$12.50.

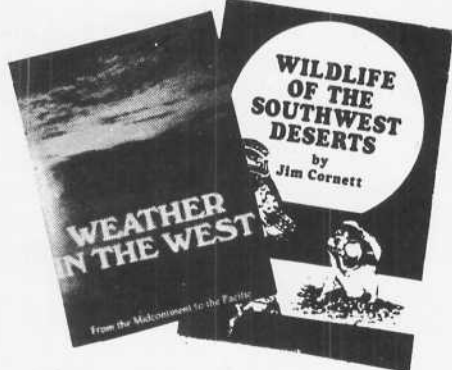
**THE ROSE & THE ROBE** by Ted DeGrazia. Text and sketches tell of the travels of Fray Junipero Serra in California, 1769-1784. Tremendous history and art appeal. Large format, 25 four-color illustrations by DeGrazia. Hardcover, \$11.75.



**RAY MANLEY'S SOUTHWESTERN INDIAN ARTS AND CRAFTS** is a full color presentation of the culture of the Southwest including jewelry, pottery, baskets, rugs, kachinas, Indian art and sandpaintings. 225 color photographs, interesting descriptive text. Heavy paperback, 96 pages, \$7.95.

**THE WIND LEAVES NO SHADOW** by Ruth Laughlin. "La Tules," an acknowledged queen of the monte game in old Santa Fe, was acclaimed not only for her red hair, her silver slippers and diamond rings, but also for her dazzling wit, which made even losers at her monte carlo table smile as she raked in their silver. Miss Laughlin has combined the historians's skill and the novelist's gift to unravel the truth about this legendary lady in a historical romance that has proven popular for nearly two decades. Hardcover, 36 pages, \$4.95.

**50 YEARS IN DEATH VALLEY** by Harry P. Gower. First hand account of the dramatic mining years by a man who spent his life in the mysterious valley. Describes the famous characters of Death Valley. Paperback, illustrated, 145 pages, \$2.95.



**WILDLIFE OF THE SOUTHWEST DESERTS** by Jim Cornett. Written for the layman and serious students alike, this is an excellent book on all of the common animals of the Southwest deserts. A must for desert explorers, it presents a brief life history of everything from ants to burros. Paperback, 80 pages, \$2.99.

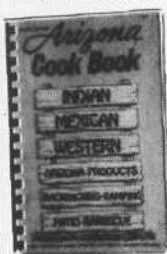
**THE NORTH AMERICAN DESERTS** by Edmund C. Jaeger. A long-time authority on all phases of desert areas and life, Dr. Jaeger's book on the North American Deserts should be carried where ever you travel. It not only describes each of the individual desert areas, but has illustrated sections on desert insects, reptiles, birds, mammals and plants. 315 pages, illustrated photographs, line drawings and maps. Hardcover, \$6.95.

**ON DESERT TRAILS** by Randall Henderson, founder and publisher of Desert Magazine for 23 years. One of the first good writers to reveal the beauty of the mysterious desert areas. Henderson's experiences, combined with his comments on the desert of yesterday and today, make this a MUST for those who really want to understand the desert. 375 pages, illustrated. Hardcover, \$7.50.

# Books for Desert Readers

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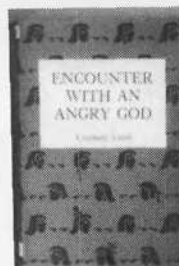
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## ENCOUNTER WITH AN ANGRY GOD

By Carobeth Laird

Superficially, Carobeth Laird's *Encounter With an Angry God* will be of interest to desert enthusiasts since portions of the story are set in Parker, Arizona, on the Colorado River Indian Reservation, and in Santa Fe, New Mexico. But the appeal of this amazing memoir is so broad that it has drawn rave reviews in major publications throughout the country and already is being hailed as a classic.

*Encounter* is a scathingly candid, beautifully written and ironically witty examination of the 80-year-old author's two marriages. The first was to John Peabody Harrington, legendary as the "mystery man" of American anthropology and "angry god" of the title. She left Harrington to marry the remarkable Chemehuevi Indian, George Laird.

The first marriage was a nightmare—or a piece of high black comedy. Carobeth is 20 in 1915 when she meets Harrington in San Diego. She is his student, star-struck by her handsome professor. He is already in the grip of his life-long mania: an obsession to record every vagrant shred of the dying languages of American Indians.

They marry, and Harrington uses and

abuses his tractable young wife as field assistant, chauffeuse, typist, cook and bottle washer and sexual receptacle.

Harrington emerges as the work compulsive gone amok, the genius driven past rationality in his quest. He is unconsciously cruel and dangerously stingy. He is exploitive of goodwill yet curiously innocent of goodwill himself. His suspiciousness borders on paranoia.

Carobeth recognizes that a stronger, older woman might have added a humane dimension to Harrington's life, but she can only become increasingly wretched, her love and awe replaced by cold distaste. She now sees her "angry god" as a "dirty little boy" having temper tantrums.

In 1919, after three years of disastrous marriage, Harrington orders her to Parker, over her tearful protests, to gather material on the expiring Chemehuevi language. George Laird becomes her informant. He is wise and kind, good-natured, competent, humorous and, moreover, he can speak four languages fluently.

They meet in recognition and in love and when Carobeth leaves Parker to rejoin Harrington, George goes with her. The three live uneasily together in Santa Fe and in Washington, D.C., headquarters for the Bureau of American Ethnology, which Harrington served for nearly 40 years as field ethnologist.

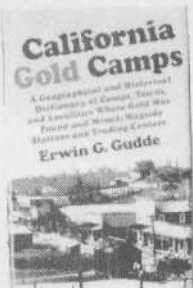
The lovers leave and after Carobeth secures a divorce, they marry. The Laids live in Poway in San Diego County, raise a large family, struggle against poverty, and continue to record Chemehuevi language and legends. George dies in 1940 following an accident, but 35 years after his death he is still "more real to me," Carobeth writes, "than any living person."

This inadequate outline cannot convey the mastery with which Carobeth Laird tells her unpretentious but fascinating story. The work is imbued with a haunting sense of intimacy, which is perhaps its special genius. We know these people when we finish the book—perhaps we have always known them. For their story is a universal one which could have been written a thousand years ago. May it live a thousand years.

Hardcover, with an introduction to Harrington's amazing career by Harry Lawton, Handsomely illustrated by Don Perceval, published by the Malki



Museum Press of Morongo Indian Reservation, Banning, California, 230 pages, \$8.95.



#### CALIFORNIA GOLD CAMPS

A Geographical and Historical Dictionary of Camps, Towns, and Localities Where Gold Was Found and Mined, and of Wayside Stations and Trading Centers

By Erwin G. Gudde

*California Gold Camps* is a basic reference that will be indispensable to the historian, the geographer, and to the general reader interested in California's colorful past.

Many books have been written about the California Gold Rush but a geographical—historical dictionary has long been lacking. With the publication of this book, a monumental project has been completed.

The California mining camp has been described as ephemeral. Sometimes it grew into a town or a city. Oftentimes, however, the camp flourished and grew, only to decay and disappear within a few years.

The geographic part of the entries gives the location with reference to known places, if possible, and the early recording of a name on a map, in a letter, diary, official document, contemporary newspaper account, or sometimes in a retrospective account.

In the historical part of the entries brief mention is made of the dates and of the development and productiveness of the place. Some folkloristic and literary sources of information are given whenever possible for the benefit of readers who may wish further information.

Seven excellent maps are included, in addition to a List of Places by County, and a Glossary and Bibliography.

This is an unusual, interesting and most informative book. Well illustrated with old photos, hardcover, 467 pages, \$15.95 until December 31, 1975; \$19.50 thereafter.

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by Emmie Mygatt and Roberta Cheney

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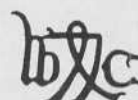
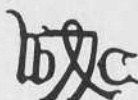
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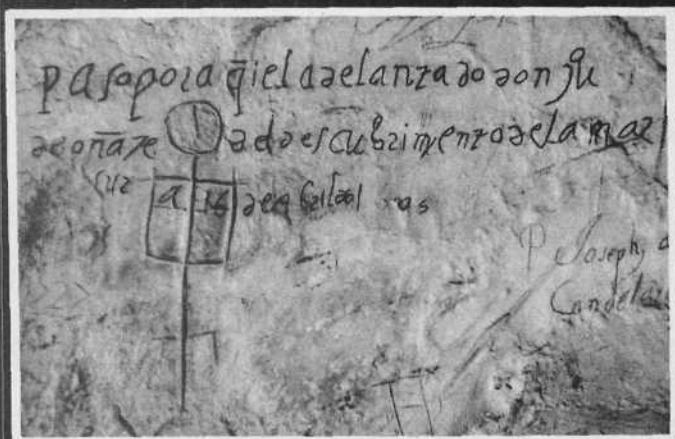
# Desert GHOSTS

by HOWARD NEAL

## El Morro National Monument

**LOCATION:** El Morro National Monument is located 58 miles southeast of Gallup, via New Mexico State Highways 32 and 53.

**BRIEF HISTORY:** This giant rock called El Morro, which appears to lift its head high enough to touch the sky, has, for centuries, been a beacon for weary travelers. The shade of its cliffs, and the cool, clear, water at its base, have acted as a magnet to attract to this spot those who moved north, south, east or west, across the hot, dry deserts of the Southwest.

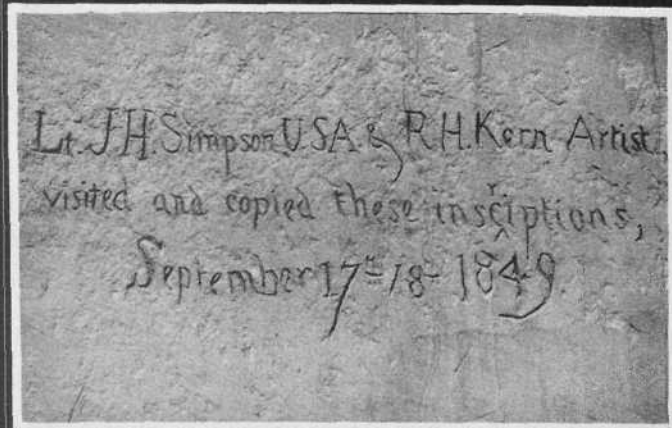


The first European to carve his name on Inscription Rock at El Morro was Don Juan de Onate, the first Spanish governor of New Mexico.

Photograph by Edward Neal

United States Army Lieutenant J. H. Simpson, and an artist named R. H. Kern, were, in 1849, the first English-speaking people to make a record of Inscription Rock.

Photograph by James Finlayson.



Indians camped here in ancient times. They drank the water, scaled the cliffs, built a small city high above the surrounding countryside, and, eventually, moved on to another place. Spaniards, seeking conquest of the northern reaches of New Spain, and Americans, moving ever westward in their trek across the North American continent, rested at the base of this towering headland.

We know that the rich and the famous, as well as the humble, were here. They left their names, and their messages for history, carved in the sandstone face of what is now known as Inscription Rock.

Some of the names carved on the cliff cannot be traced. They are simply signatures which have been left for posterity by otherwise anonymous travelers. Others, though, are the names of the great, or the near-great, who took part in the making of the history of what is now the southwestern United States.

In April of 1605, 15 years before the Pilgrims landed at Plymouth Rock, Don Juan de Onate recorded his "discovery" of the "Sea of the South." Onate was the first Spanish governor of New Mexico and the first European to carve his message on the rock. He was not, though, the first to view the "Sea of the South," today's Gulf of California.

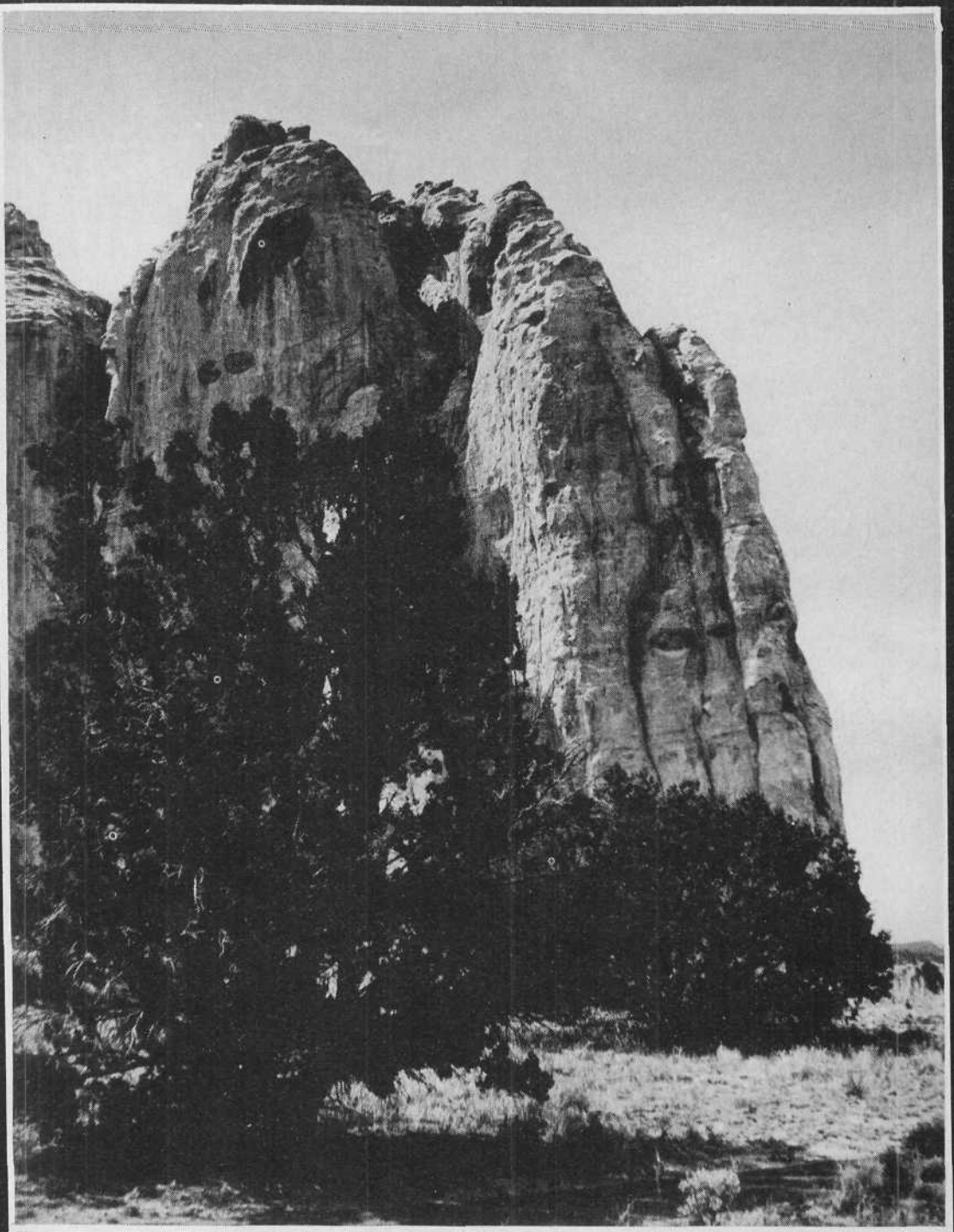
By the time the last Spanish inscription was made in 1774, the rock had been carved by generals, governors, and bishops, as well as their less noteworthy followers. The words tell of conquest, they tell of discovery, or they simply note that a traveler journeyed this way.

As time passed, the Americans, too, left their marks. The first was Army Lieutenant J. H. Simpson who recorded that he and an artist, named R. H. Kern, copied the inscriptions in September 1849. Another was Lieutenant Edward Beale, who, in 1857, stopped at El Morro with a caravan of camels imported for use by the Army. Settlers, surveyors, Indian agents and traders all left their names and their messages on the sandstone cliffs.

What about those, though, who chose not to take a knife in hand to record their presence? We know that Antonio de Espejo stopped at El Morro in 1583. The visit is noted in the journal of the expedition. What about earlier explorers? Did Alvar Nunez Cabeza de Vaca stop here during his eight-year



El Morro  
towers high above  
the surrounding desert  
landscape in  
western New Mexico.  
For centuries  
the shade of its cliffs  
and the cool,  
clear, water at its base  
have attracted  
passing travelers.  
"Morro" means  
"bluff" or "headland"  
in Spanish.  
Photograph  
by Edward Neal.



journey through the Southwest in the early 1530s? Did Fray Marcos de Niza reach this far north in 1539 while he was searching for the Seven Golden Cities of Cibola? What of Don Francisco Vasquez de Coronado? How could he and his army of conquistadors have missed El Morro while in 1540 and 1541 they, too, searched for Cibola and the legendary riches of the magic land of Quivira? The signatures of these explorers are unrecorded, yet they, too, perhaps were here. Theirs, in a sense, are the signatures we cannot see, the ghost signatures of El Morro and the vast deserts of the Southwest.

**EL MORRO TODAY:** El Morro, and a surrounding area of more than 1,200 acres, have been

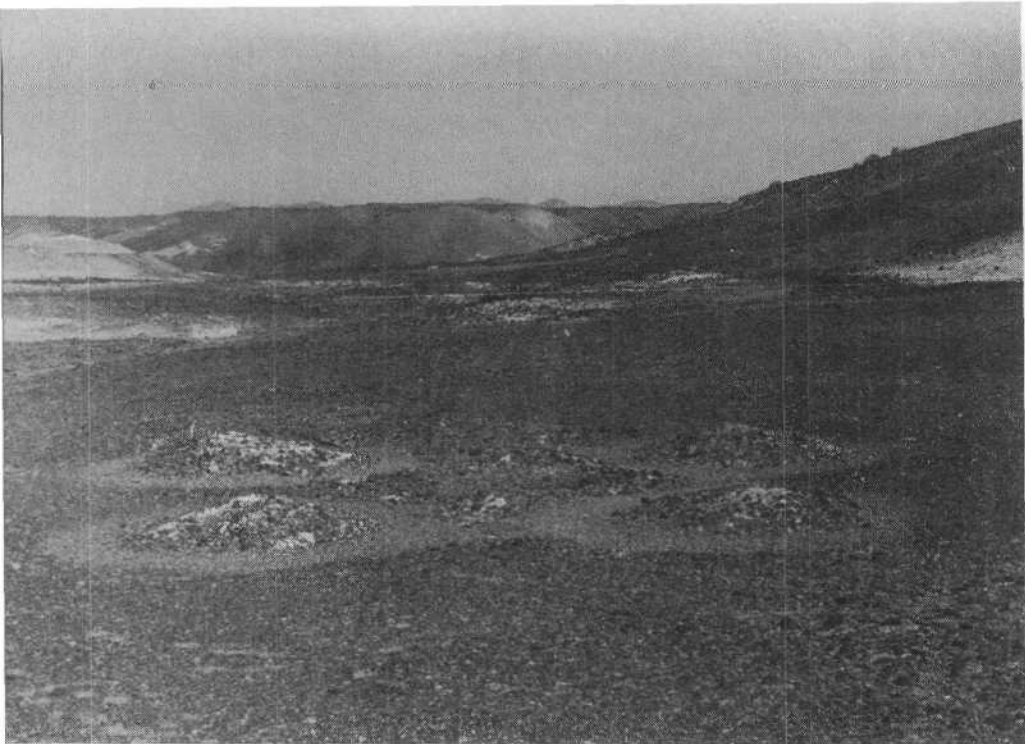
protected as a National Monument since 1906. The signatures and messages have been preserved with care, as have the Indian ruins on top of the bluff.

At the Monument Visitor Center one can learn of the area's rich history and obtain a tour guide which explains, in detail, the sights to see along the Monument's well marked trails. There is a small campground and picnic area, but there are no overnight accommodations for non-campers.

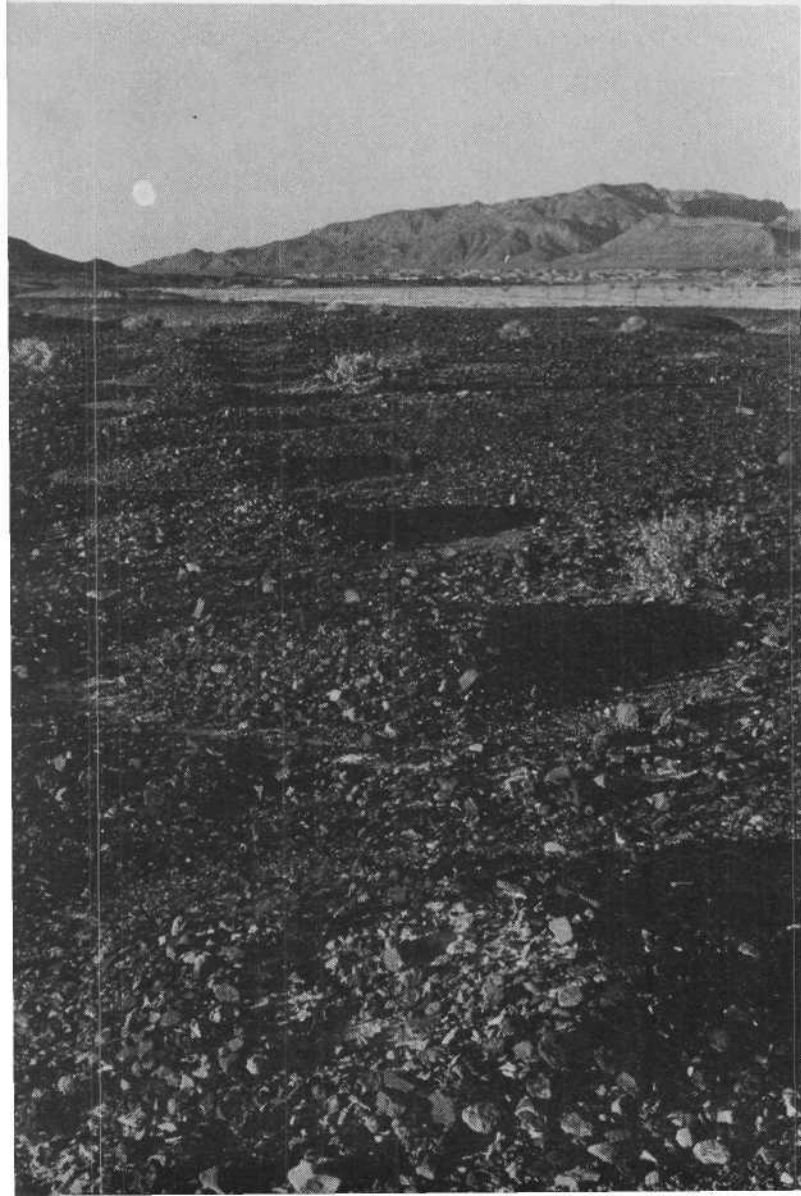
The Indian ruins, the signatures, the names, and the messages at El Morro are, in a way, a history book carved in stone. If you are fascinated by that great history of the American Southwest, it is heartily recommended that you visit the Monument and read this first edition. □

# Amargosa Mystery Rings

AN INTRIGUING  
DESERT MYSTERY WHERE  
AN ARCHEOLOGICAL DETECTIVE  
GOES AROUND IN CIRCLES  
IN SEARCH FOR  
A RING OF TRUTH



*These four rings, in an unusual diamond formation, are 50 yards from a 1916 U.S. Land Survey marker establishing the common corner of four square-mile sections. The survey stake is the dark vertical object visible behind the center of the mound.*



by  
**GARY  
RICHARDSON**

**T**HE AMARGOSA VALLEY of eastern California is a maze of low, barren mesas set among broad, sandy washes. Sparse clumps of sage and desert holly bleach in the alkaline glare of the desert sun. Wind-swept sands whisper over signs carved upon the parched ground by a hidden past while underneath the bitter waters of the Amargosa River seep like an object of ancient myth. An occasional snarl of mesquite suggests the terms of survival. Its location just to the east is only one of the reasons the Amargosa Valley is known among its few, hardy inhabitants as Near Death Valley. An air of mystery pervades such country, and legends abound of ancient ones who passed and whose spirits perhaps yet remain.

Two years ago a report reached the Eastern California Museum in Independence that a series of strange "circles" had been discovered atop a mesa near Shoshone, an isolated oasis town in the Amargosa Valley. As a researcher for the museum I went to investigate. Most locals were either ignorant of the circles or vague about their exact location. Finally I met Jerry Culbertson, a resident of Tecopa Hot Springs and a dabbler in desert lore, who was willing to guide me to the mesa site.

We located a series of 28 ringed mounds spaced at various distances

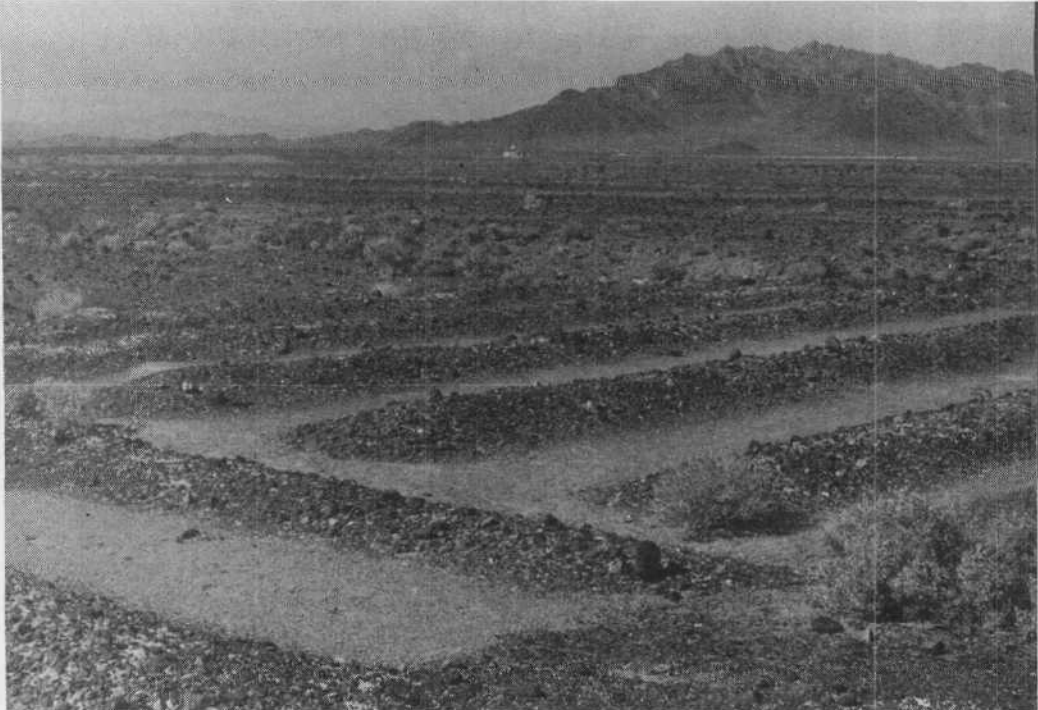
*Several of the 28 "ceremonial cairns" recorded by archeologist Malcolm Rogers 50 years ago. The ringed mounds follow a basically north-south course across a mesa several miles south of Shoshone, Calif.*



along a basically straight, north-south line extending about 300 yards across the mesa top. Each mound form is comprised of a foot-wide circular path or ring about six feet in diameter worn an inch or two into the desert pavement. Within each ring gravel has been heaped into a gentle mound whose center rises about a foot above the level of the surrounding path. Culbertson also located a 29th, less defined mound atop a small hill about 150 yards due west of the northern end of the line of 28 rings.

My subsequent research turned up a reference to the mesa-top site in *Ancient Hunters of the Far West*, a posthumous collection of the work of archeologist Malcolm Rogers published by the San Diego Museum of Man in 1966. Rogers visited the Amargosa Valley about 50 years ago seeking evidence for his theory that the area had been on the migration route followed by prehistoric man. Rogers conjectured that beginning over 10,000 years ago several waves of humanity passed through Arizona, Nevada, and eastern California on their way to Central and South America. *Ancient Hunters of the Far West* tells of the presence of early man in the Amargosa Valley. Rogers called the first people to pass through the area the San Dieguitoans. They were followed by a group named the Amargosans because of their occupation of the valley's gravel mesas around the year 5,000 B.C. In this period, known as the Little Pluvial, the Amargosa River is thought to have had a heavier flow of fresher water than today.

In support of his theory, Rogers found stone artifacts, "cultural debris," and sleeping circles which he related to similar discoveries made elsewhere. Sleeping circles are areas cleared of the more uncomfortable pieces of gravel, where small groups are thought to have huddled, sharing their body heat through the chill of the desert night. Such smoothed areas are still visible along the narrow footpaths worn across the mesa terraces before the white man came. Perhaps the most remarkable of the Amargosa Valley discoveries mentioned in *Ancient Hunters of the Far West*, though, is the "ceremonial mesa, with its strange series of circular cairns" which Rogers found south of Shoshone. "He concluded," the caption to a full-page photograph of the site Culbertson and I visited adds, "that this very large



*One of several groups of elongated mounds which occur in conjunction with the ringed mounds at various locations. At this site there are 15 elongated mounds [not all visible in this picture], some running north-south, others east-west.*

gravel pictograph, a series of 28 cairns, was of Amargosa I age (ca. 5,000 B.C.) because the enclosed worked flakes were too fresh to be of the San Dieguito period." The site is unique, for Rogers discovered nothing like it anywhere else in the large area of the Southwest he studied.

Backed by such eminent authority I added my efforts to those of a few others who knew of the site and wanted it protected. The Inyo County Board of Supervisors adopted a resolution urging the Bureau of Land Management to take protective measures. The B.L.M. earmarked funds to have a fence constructed around the rings, which were already showing signs of vandalism. Then, Jerry Culbertson excitedly informed me that he had found more rings — hundreds of them!

While Rogers' was perhaps the most authoritative explanation of their origin, not everyone who knew of the rings was going for the ancient hunter theory. Some, primed by such fantasies as Erich von Daniken's *Chariots of the Gods*, developed their own ancient astronaut theories to account for the mysterious rings. Culbertson was no stranger to such musings, which may have led him to suspect that there were more rings in the area. Exploring the washes directly south of the mesa, he came upon over a dozen circular mounds which appeared to be a continuation of the original 28. He

spent months hiking the southern end of the Amargosa Valley and turned up several hundred additional rings, rock piles, and elongated mound formations which seemed to relate to the original mesa-top site.

Armed with topographical maps, camera, and compass, I trekked out into the desert to examine Culbertson's new discoveries. What I found cast doubt on Rogers' ancient hunter theory for several reasons. Many of the newly discovered rings occur in washes or other low-lying areas where the ground is softer and looser than that of the mesa top. For this reason, while they are clearly of the same construction, these rings show more erosion and are less distinct than those on the mesa. While the rings found in firm, high ground could conceivably have withstood centuries of weather, the more recent finds could hardly be a century old, let alone the more than five millennia posited by Rogers.

Deke Lowe, a veteran of the Tonopah and Tidewater Railroad that once served the Amargosa Valley, is a long-time resident of the area and well-versed in its history. He has known about the mesa site for over 10 years and has never subscribed to the notion that the rings are prehistoric. He was not impressed when I told him of Rogers' theory about the rings. "You don't know exactly why," he said, "but when you've been around this country all your life, you have a kind

of intuition about these things." Culbertson's discoveries strengthened Lowe's conviction that the rings date back no further than the 1880's, when the area was subject to wide-spread borax mining activity. A miner once told Lowe that the mounds reminded him of borax prospects. Lowe, no stranger to mining, admitted that it was difficult to understand why anyone would prospect every few feet along a straight line for distances ranging from a few hundred yards to over a mile, the length of some of the newly discovered rows.

The pattern that emerged as I plotted the positions of the mounds on the map finally convinced me of the impossibility of their ancient origin (see map). Their sheer numbers and diverse locations argued against any but the most cosmic of ceremonial functions — and I wasn't going for the ancient astronauts. But the crucial discovery was that every row of rings, including the original 28, coincides almost perfectly with surveyed section or quarter-section boundaries. (The north-south rows are off-set about 100 feet to the west of the survey lines, but this error is consistent.) Even more remarkable is the fact that, starting with the most south-easterly series, the rows proceed a half-mile north then turn and continue a half-mile east, then turn again to run north exactly one-half mile, then east another half-mile to end up directly south of the original 28 rings. At each of the turns one encounters either a group of elongated mounds or "windrow mazes," or a special configuration of rings or rock piles. Clearly, the rows had once served as some sort of boundary marker. This suspicion was further confirmed by our discovery of narrow wooden stakes — some bearing a single, square-headed nail — in several of the mounds and piles. Now the question remained: Who would go to the trouble of constructing such an odd and elaborate system to mark out a boundary across such a vast and desolate territory?

Shortly after my mapping venture I learned that an amateur archaeologist had been in the area investigating the rings. The word of Culbertson's discoveries was out. I had been in contact with Ken Hodges, associate curator of the San Diego Museum of Man, to learn more about Rogers' work on the rings. Hodges supplied me with Rogers' field notes on the rings as well as the phone

number of the archaeologist who had been following up Rogers' work.

Curious to find out what conclusions he had reached, I contacted the archaeologist who had been looking into Culbertson's discoveries. At first he was reluctant to discuss the rings with me; but after establishing his credentials as a licensed, avocational archaeologist, he admitted that he, too, had mapped the rings. When I mentioned the coincidence of the rings' locations with quarter-section boundaries, he brushed aside my question. "The surveyors had to start someplace," he quipped. He said that he was convinced the rings were the work of ancient man and that he had found artifacts to back up his convictions. When I pressed for more details, he told me he would be publishing the results of his findings and I could see them then. The mystery compounded.

My next step — my last hope in solving the mystery — was to visit the Inyo County offices in Independence. I wanted to accomplish two things: I had to find out all I could about surveying, and I wanted to see any maps the county had of the area. First I talked with A.R. Brierly, who had once done some surveying in the Amargosa Valley. He had never seen or heard of the rings; and when I showed him some pictures of them, he didn't know what to make of them. Next I visited Roger Glidden, the county engineer, who could shed little light on the mystery either. However, he did give me a crash course in the history of surveying, from which I ascertained that the rings and the wooden stakes with their square-headed nails had not been the work of government surveyors. And, no, surveyors never worked from local landmarks but laid out their section lines from standard meridians.

Next I visited the county assessor's office, and things began to fall into place. The plat maps revealed that the United States Borax and Chemical Company own a patented mining claim, the Amargosa Borax Claim, whose boundaries coincide almost perfectly with the rows of rings, rock piles, etc. (see map).

I dashed over to the county recorder's office to examine the records of patent. There, listed under Amargosa Borate Claim, I found what I had been looking for: letters of patent issued in 1887 showing that "The Henry Clay Mining Co. did on the 24th day of April, A.D.

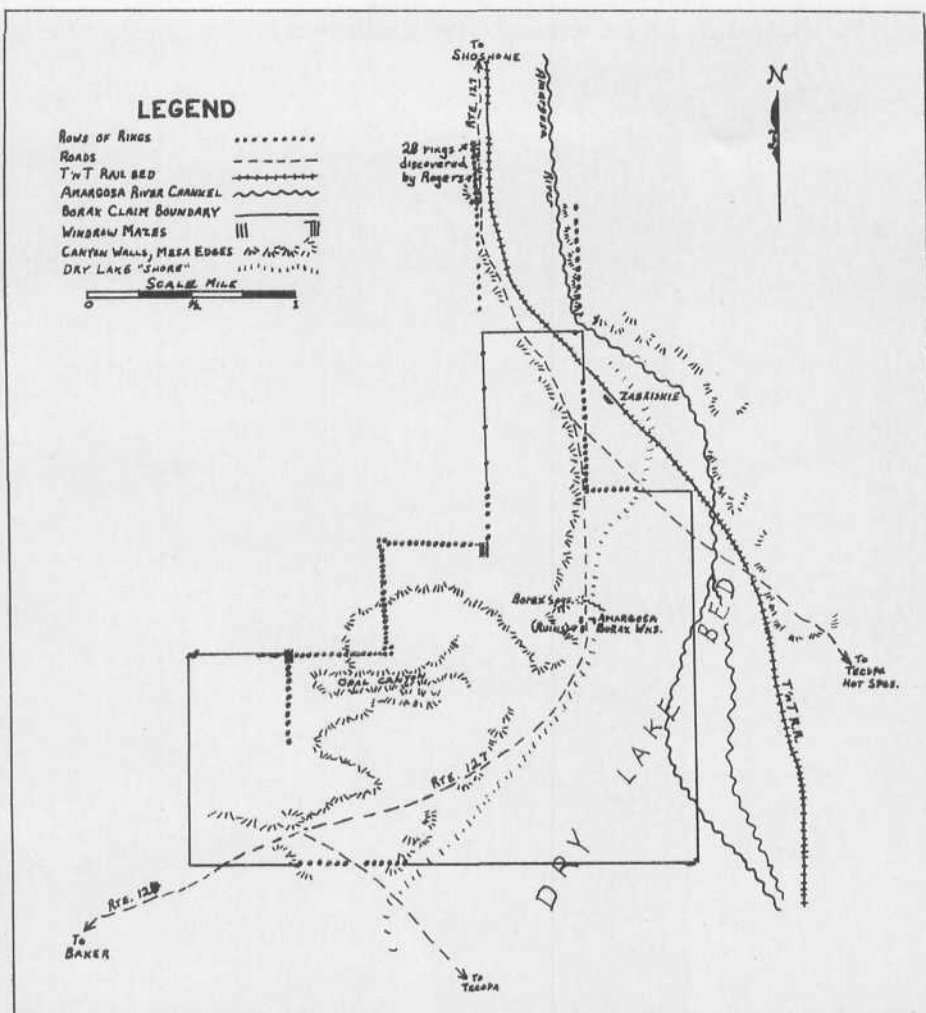
1885, duly enter and pay for that certain Placer mining claim" whose description fit the assessor's map.

The next day I called the B.L.M. to tell them to save their fence, unless they wanted to fence off over five miles of rings, most of which were on privately owned land. A few days later a meeting of federal and county officials was held at Tecopa Hot Springs to examine my findings, and the B.L.M. decided not to fence the "ceremonial mesa."

Having associated the rows with the boundaries of the Amargosa claim, I was still left with a few questions: Why were there hundreds of rings when a few rock-pile monuments would have sufficed as boundary markers? What function did the elongated mound complexes serve? What about the many rings that do not coincide with the claim boundaries? I queried U.S. Borax for any information they might have about the claims. Unfortunately, the records of their 19th-century operations were destroyed in the San Francisco earthquake of 1906. A check of the field notes of the government survey of the area showed no mention of the rings. Apparently there was nothing outstanding about the rings to the 19th- and early 20th-century surveyors, or they would have made note of them. The surveyors would have paid no attention to the rings, I reasoned, only if they were a common occurrence. Since saltmarsh borax operations were phased out in the early 1890's, a bit of historical research was necessary to confirm this hunch. I had to know exactly what went on in the area in the 1880's.

Located near the center of the claim was the Amargosa Borax Works, the adobe ruins of which can still be seen west of Tecopa Hot Springs along highway 127 (see map). The Amargosa works had been operated in the summer in conjunction with William T. Coleman's Harmony Borax Works near Furnace Creek when Death Valley was too hot for borax to crystalize. In the early days the process of borax extraction was actually more of a farming than a mining operation. In the salt flats of both the Death and Amargosa Valleys borax is leached from the soil by water seepage to form a crust of fluffy, white "cottonball" crystals on the surface. This is a natural process in low-lying areas where the soil is damp just below the surface much of the year. If the cottonball is picked or





scraped away, it will "grow" back within a year or two. This is how the "white gold of the desert" was "harvested" initially.

However, it did not take long for the enterprising borax men to discover that they could significantly increase the yield of their "crop" by helping nature along with a little irrigation. By flooding the borax-rich soil a new crop of cottonball could be produced every few months. By furrowing the soil into elongated mounds or windrows, water could be held in place long enough to seep into the ground to produce cottonball even on high ground where natural rainfall dampened the soil for a few days at the most.

This line of reasoning explains the presence of the elongated mounds or windrow mazes located on high ground at several points on the boundary of the Amargosa claim. This assumption proved correct when I found similar furrowed and mounded areas near both the Harmony and Eagle Borax Works in Death Valley. But what about the rings?

Deke Lowe's hunch was correct. Before furrowing and flooding miles of

desert, it would be a good idea to know which areas were richest in borax. By digging a small, circular ditch and filling it with water one would know in a few weeks whether or not an area contained enough borax to work it profitably. Coolie labor was used extensively in the early borax mining operations of the Death and Amargosa Valleys. These men worked with machine-like precision. On the salt flats near the Harmony works one can still see regularly spaced rows of identical circular mounds of cottonball which were methodically piled up by coolie labor in the 1880's.

Undoubtedly the same laborers were assigned the task of creating the rows of rings in the Amargosa Valley during the summers when Death Valley became so hot the borax refused to crystallize. Where the flooded rings produced a good crust of white crystal, the land which they bounded was patented. This crust can still be observed in some of the rings today. Where the rings were only marginally productive, the claim was abandoned — thus explaining the presence of the two parallel rows of rings, a half-mile apart, which extend

north of the patented Amargosa Borax Claim (see map). The most northwesterly set of these rings, the 28 "ceremonial cairns" discovered by Malcolm Rogers, weren't even good borax prospects.

There is a wealth of mystery awaiting the adventuresome desert lover in the Amargosa Valley. But please, be careful. Before anyone knew for sure what they were, many of the Amargosan Rings had been dug into by the curious and tracked over by the careless. Venture into the desert with respect. After all, you never know what ancient spirits, or even cosmic watchers, might be visiting the areas you explore. □

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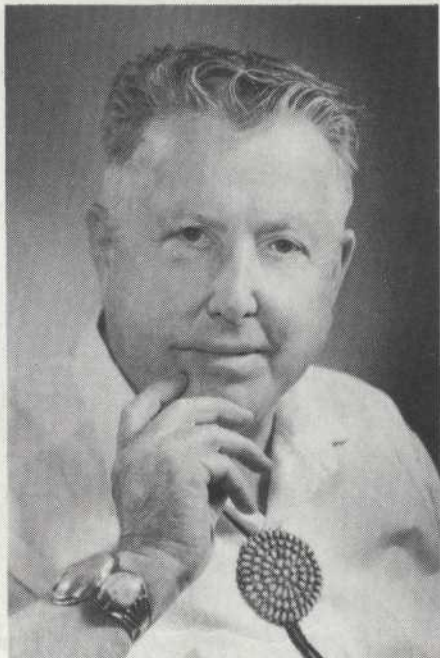
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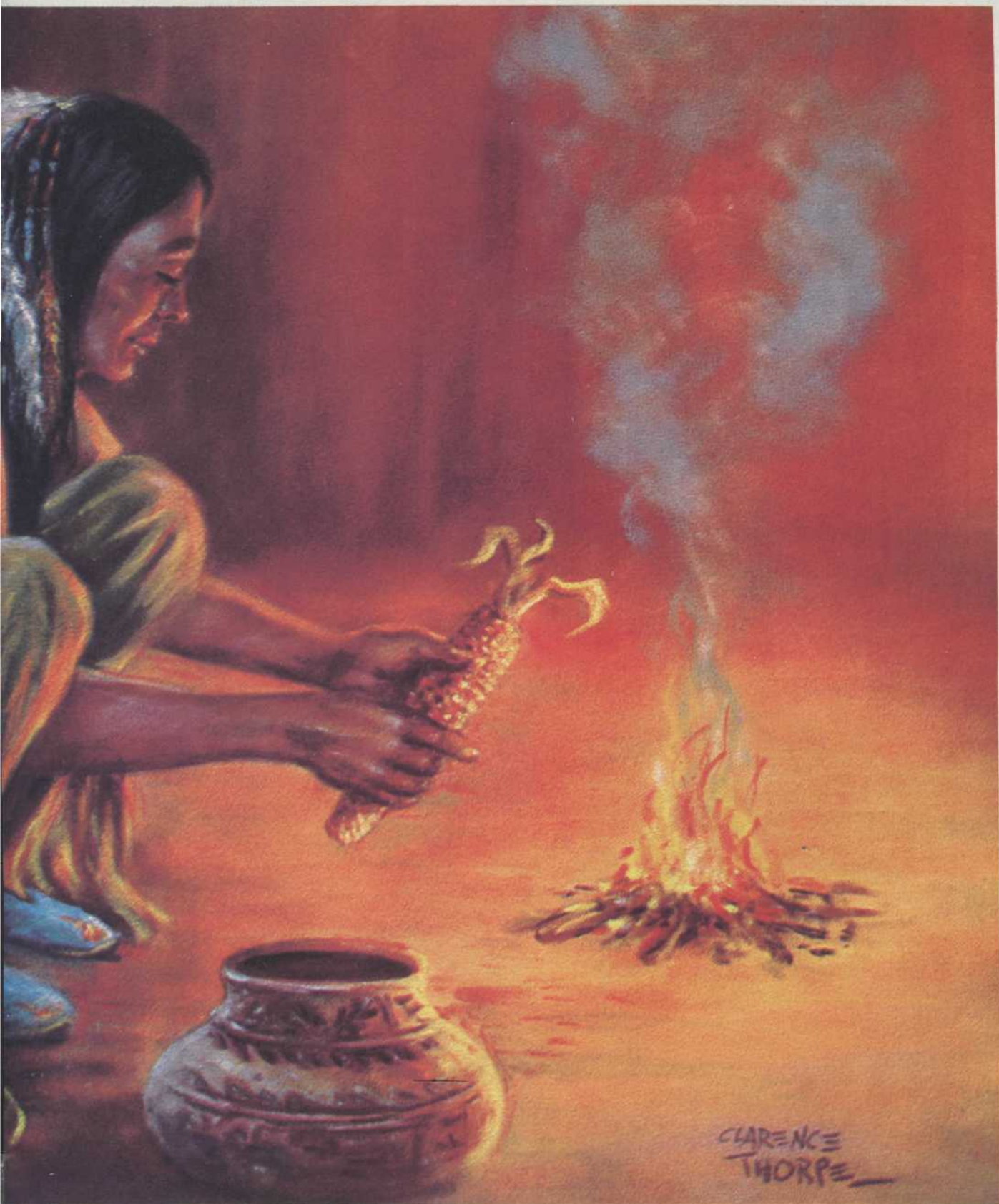
CLARENCE  
THORPE

THIS MONTH'S feature artist, Clarence Thorpe, of Riverside, California, brings the West alive in vibrant pastels and stark pen and ink.

Beginning sketching as a boy of nine—doing a portrait of the local barber—he has developed his skills and for the past twenty years has concentrated on religious paintings and western art. He currently has twenty-four of his subjects in print form.







16"x20", Pastel, "Corn Ceremony"





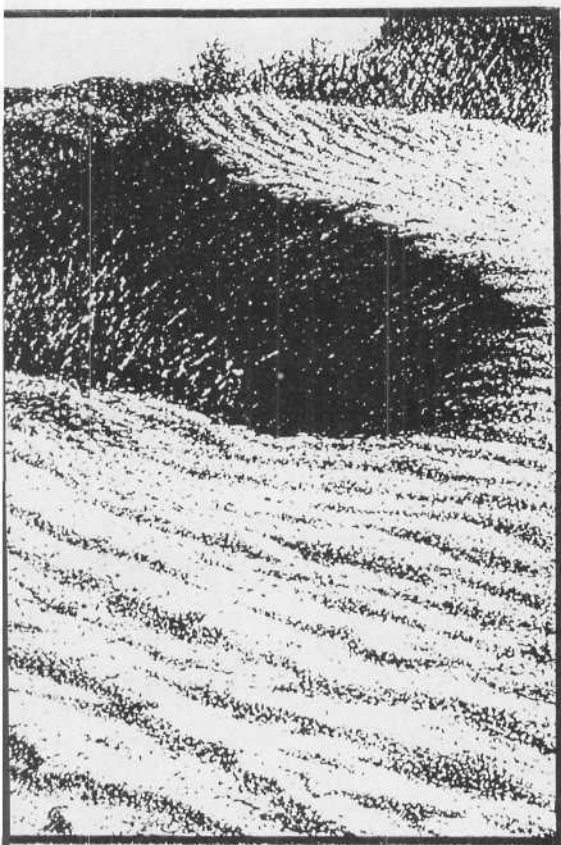
12"x9", Pen and Ink, [Print] "The Chief"

Although Clarence personally prefers the pen and ink technique, it is his pastels that seem to breathe life into his subjects.

Well versed in the field of commercial art, he rendered cartoons for Ripley's "Believe It Or Not," and during the 1934 World's Fair, demonstrated cartooning simultaneously with hand and foot. Demonstrations were also performed blindfolded, these feats being published five times by Ripley. Clarence was also voted one of the top ten sports cartoonists







9"x12", Pen and Ink, "Way Out on the Windswept Desert"



13"x10", Pen and Ink, "Black Beauty"

at the New York World's Fair.

The Eisenhowers, Roy Rogers and Oral Roberts are a few of his many notable collectors.

A quiet and unassuming man, he is very reluctant to "blow his own horn" and says: "Just let my work speak for me."

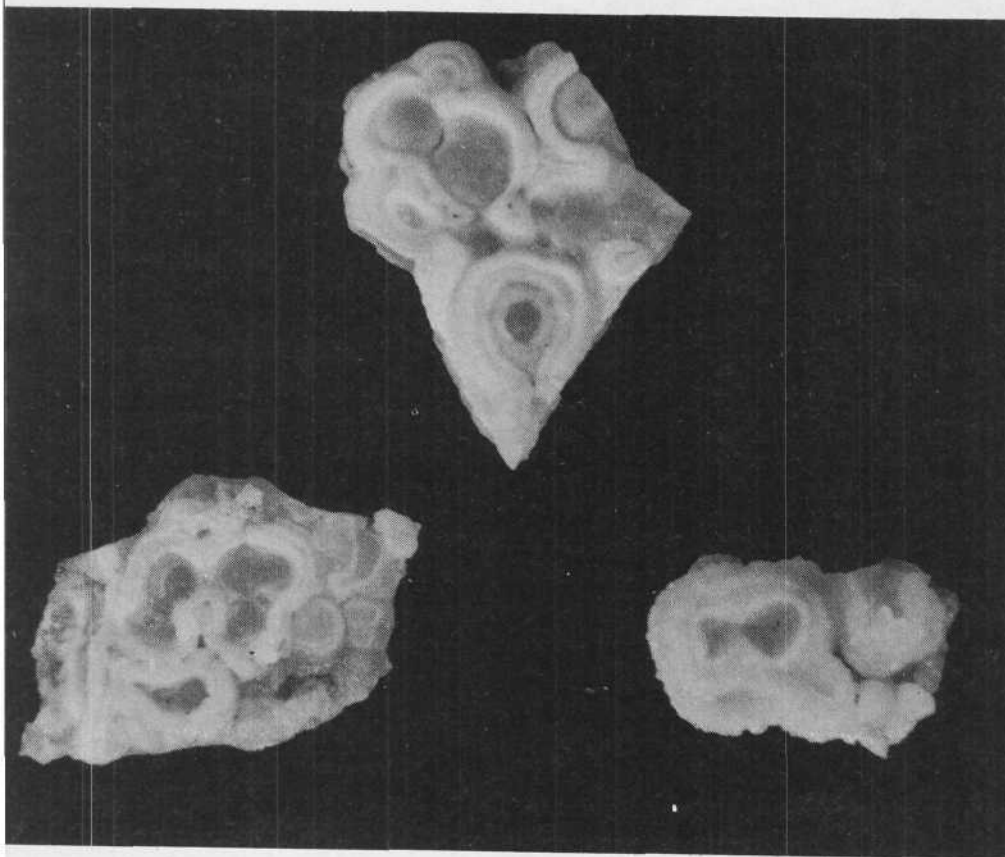
You can hear their messages currently on exhibit in California at Criswood Gallery, Rancho California; Greenwood Art Gallery, San Bernardino; Robinson's Antiques and Art Gallery, Laguna Beach; The Jewel Box, Riverside; and Desert Magazine. □

11"x17",  
Pen and Ink,  
"The Fold"



Above: Broad, flat-bottomed washes, lined with Ironwood and Palo Verde trees, are typical of flash flood regions such as Mopah Peaks. It is along these water-courses that most of the desert's wildlife finds sanctuary. Below: Many unusual and interesting chalcedony roses will be found in the Mopah Peaks region. Some can just be cleaned then mounted for jewelry "al la natural."

# Mopah



**W**INTER BREATHES LIGHTLY on California's Southern Desert Region. Infrequent storms have generally lost their steam after crossing mountain barriers and "shirt sleeve" weather in January is not unusual. Winter is a good time to camp, relax and enjoy the desert clime. More and more desert enthusiasts are doing just this — not only spending their vacations but Thanksgiving, Christmas and New Year holidays in pursuit of winter sun and fun.

Are you planning a winter trip? Do you prefer an easy-to-reach location far from busy highways that offers a picturesque setting and a good rock collecting area? If so, you will wish to head for the southern corner of the Turtle Mountains in San Bernardino County to search for Mopah Roses.

Two volcanic peaks, called Mopah, dominate the low profile of the Turtle Mountains at their southern extremity. Since prehistoric time, they have served as landmarks for Indians and early-day prospectors. More recently, they have





# ROSES

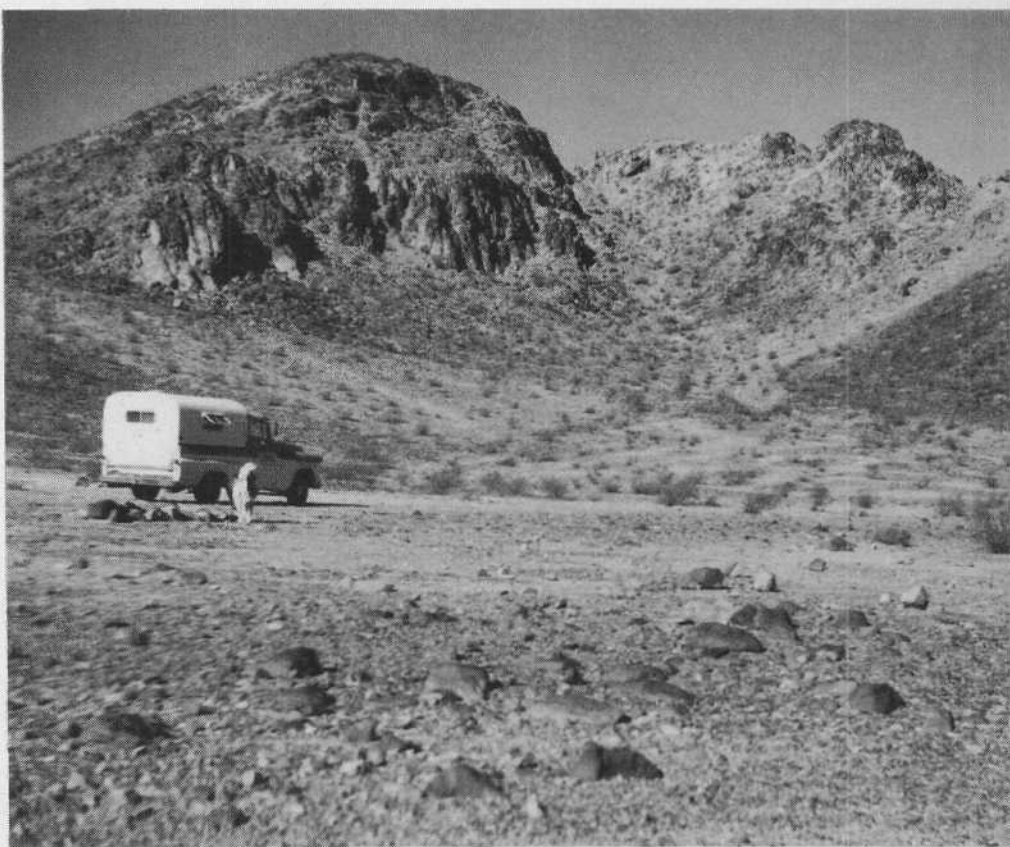
by  
**MARY FRANCES  
STRONG**  
photos by Jerry Strong

Above: The low profile of the Southern Turtle Mountains is dominated by Mopah Peaks. They have long been landmarks for prehistoric Indians, prospectors, lost mine hunters and, more recently, rock collectors. Below: A cozy camping area is sheltered by the hills at Mopah South. Roses will be found around camp, but the best collecting is a short distance north.

guided lost mine hunters and rock collectors to a spring which has provided a welcome oasis in a vast, uninhabited land.

Today, Mopah Peaks are picturesque sentinels for a fine rock collecting locale. Tremendous alluvial fans spread out from the mountains. Scattered over them in an area four miles wide (east to west) and 10 miles long (north to south) are chalcedonies known as "Mopah Roses." This great field was first described in 1940. Their profusion caused *Desert's* founder, Randall Henderson, to write, "This is a gem field that will never be exhausted." How right he was! Thirty-five years later, chalcedony roses still cover the ground.

Roses in the Mopah field occur in white, creamy, pink and rarely, a pale blue or lavender color. Some will have drusy or small crystals on them. Occasionally, they will contain bands of limonite similar to fire agate specimens. Sizes range from tiny buttons to roses a couple of inches across. Collecting is





Above: An old rockhouse ruins, near the entrance to Mopah canyon, is "end-of-road" for vehicular traffic. The canyon and the peaks are now within B.L.M.'s Closed Area #34. However, The Flats are open to collecting. Below: Along the eastern face of the Southern Turtle Mountains, chalcedony roses occur on alluvial fans for a distance of about 10 miles.

only a matter of walking and looking for the more unusual specimens.

This very extensive field of chalcedony roses can be easily explored from two points referred to as "The Flats" and "Mopah South." The turnoff to Mopah South is 5.9 miles north of Vidal Junction

on Highway 95. When the dirt road branches, three-tenths of a mile from the highway, keep left. There are all sorts of tracks leading in many directions. Just stay on the main road for 2.6 miles. Turn right and select a campsite in the shelter of the hills. This route is O.K. for

trailers.

Roses will be found over a considerable distance here. We collected some particularly nice specimens a short distance beyond camp (see map). This is a good locale for serious collecting as short hikes away from camp lead to deposits which seem almost untouched.

Just beyond the turnoff to the camping area, a short road leads behind a hill. At its end, a trailer appeared to be permanently parked and it was obvious someone was living there. We found no one around so didn't learn whether it belonged to a prospector or folks just spending the winter.

Chalcedony is a fine-grained variety of quartz. Roses are often formed when viscous, chalcedonic silica is deposited at relatively low temperatures and pressures as cavity fillings in altered, basic, igneous rocks. There are also several outstanding deposits in the Northern Turtle Mountains (see *Desert*, Feb. 1971).

Knowledge and use of chalcedony dates back to antiquity. The Holy Bible describes New Jerusalem as a city of pure, transparent, gold-like glass and surrounded by a wall of jasper built on 12 layers of foundations imbedded with gems. In order, these layers contained jasper, sapphire, *chalcedony*, emerald, sardonyx, sardius, chrysolite, beryl, topaz, chrysoprase, jacinth and amethyst.

Six and one-half miles north of Mopah South (12.4 miles north of Vidal Junction), lies the turnoff to "The Flats." Small roses will be seen almost as soon as you leave the highway. Four miles west, a steep wash bisects the road. This is a good central camping area. It is also advisable to park trailers here. Another mile and a half brings you to the base of the mountains, a rock ruins and entrance to Mopah Canyon.

Mopah Canyon and the interior of the Turtle Mountains are within the Bureau of Land Management's Closed Area #34 (Turtle Mountain Interior). The base of the mountains and their broad alluvial plains are not. However, this locale is in Area #37, where you are required to use *only existing roads and trails*.

An overall map of the Desert Plan and detailed maps of the various areas are available from B.L.M., Box 723, Riverside, CA. 92502.

Since the chalcedony roses occur on





alluvial slopes, the closure of Mopah Canyon does not affect rockhounds. It does deny four-wheelers the opportunity to drive up the picturesque canyon. The closure does not bar hiking and the three-mile hike can be made at a leisurely pace. Take along your lunch and binoculars. Because of the water available at Mopah Spring, a number of birds and animals live in the canyon.

A small herd of Big Horn Sheep also reside in the higher reaches of the Turtle Mountains. In order to protect them, the interior region was closed to vehicular traffic. Big Horn Sheep and the noise from man's machines are not compatible. Desert Big Horns are becoming rare and they must be protected. Since the B.L.M. has mentioned their existence on the Interim Management map, an explanation of this closure seemed appropos because I normally do not mention the presence of game animals in my articles.

Mopah Spring provided water for early Indians traveling the many trails across the desert. On the western side, a trail comes north from the spring toward the Old Woman Mountains and is readily visible today. Several years ago, we were hiking along it when Jerry spotted a three-inch-square potsherd. We hunted the area thoroughly but not another piece was found. We speculated that an Indian had probably broken his water jug.

Over the last century, Mopah Springs has been a welcome oasis for prospectors. Many came to find the fabled "Lost Arch" placer gold deposit. The story still circulates and men continue to search for the golden treasure.

Chalcedony roses have long been popular among rock collectors. This is probably because their beauty can be enjoyed without the use of special lapidary equipment. Many are so well-formed they truly resemble "rock roses." They can often be cleaned and used in their natural state for jewelry or decorative pieces.

Many methods are used for cleaning specimens. The following system seems to work very well. Place roses in a pan and cover with cold water. Add one pint of bleach and one pint of detergent (we prefer Tide). Bring to a boil and let cool over night. Scrub thoroughly with a strong-bristled brush, then rinse well.

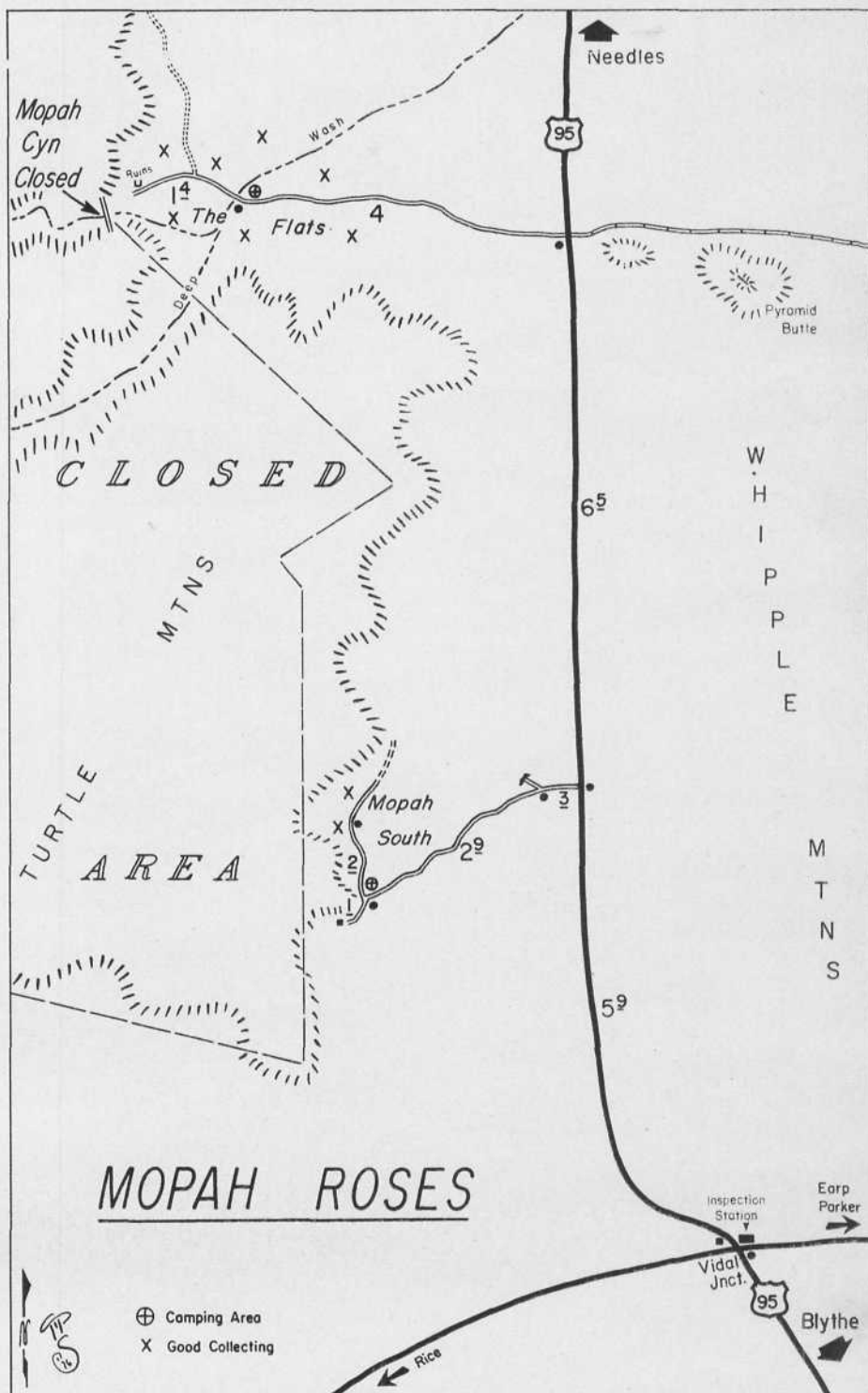
In a heavy glass, glazed crock or

plastic container place about two cups of muriatic acid (Hydrochloric). The exact amount depends on the size of the container. Using wooden tongs, carefully place a few roses at a time in the acid. Leave until the bubbling stops. Remove with tongs and rinse well in cold water. Soak seven to 10 days in a solution of one pound oxalic acid to two gallons of water. Remove and wash in detergent using scrub brush. Rinse thoroughly. Hopefully they will now be shiny and clean.

After such a cleaning, many specimens can be mounted to create exquisite


jewelry. Chalcedony roses also tumble beautifully and larger specimens can be slabbed and polished. Cutting often produces wavy, cloudy and flow effects which result in attractive cabochons.

Though more and more people are turning to rock collecting as a hobby, there are still many locales where it is possible to "get away from it all." The Mopah Peaks region will provide good primitive camping, clean dry air and clear blue skies, plus a field of chalcedony roses. What more could anyone ask? □









Angel Arch  
and  
The Molar.

# To See an Angel

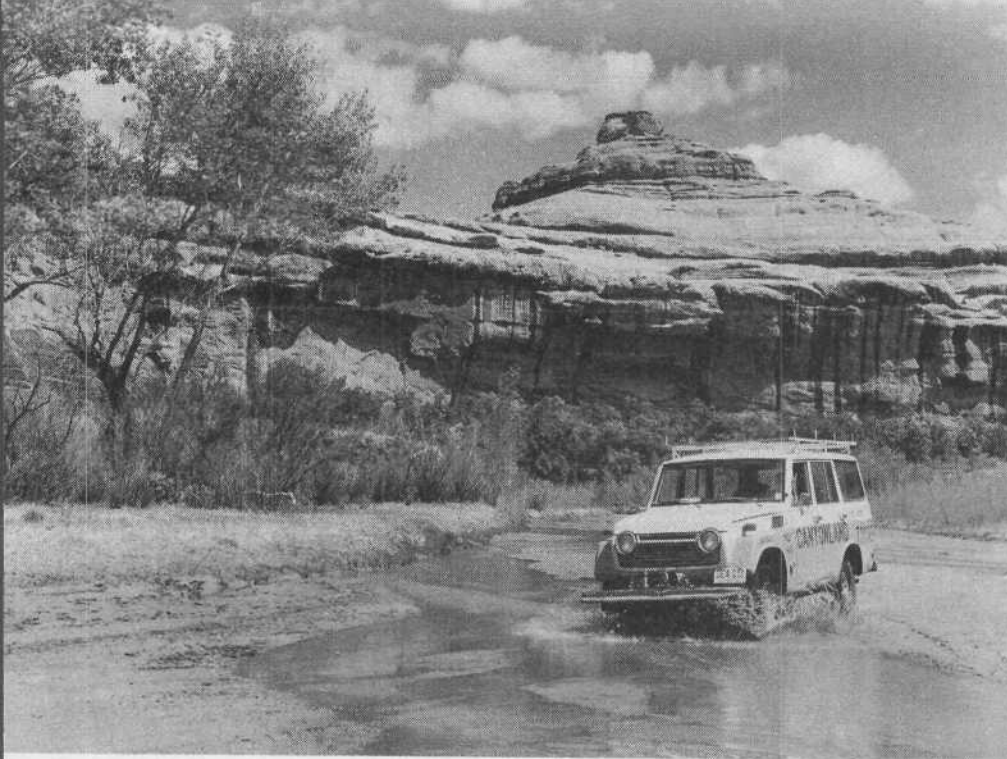
by F. A. BARNES

**K**ENT FROST'S Canyonlands Tours is one of the oldest backcountry guide services in southeastern Utah. It is also the only guide service in the area with an Interstate Commerce Commission permit covering five states—the Four Corners states plus Nevada.

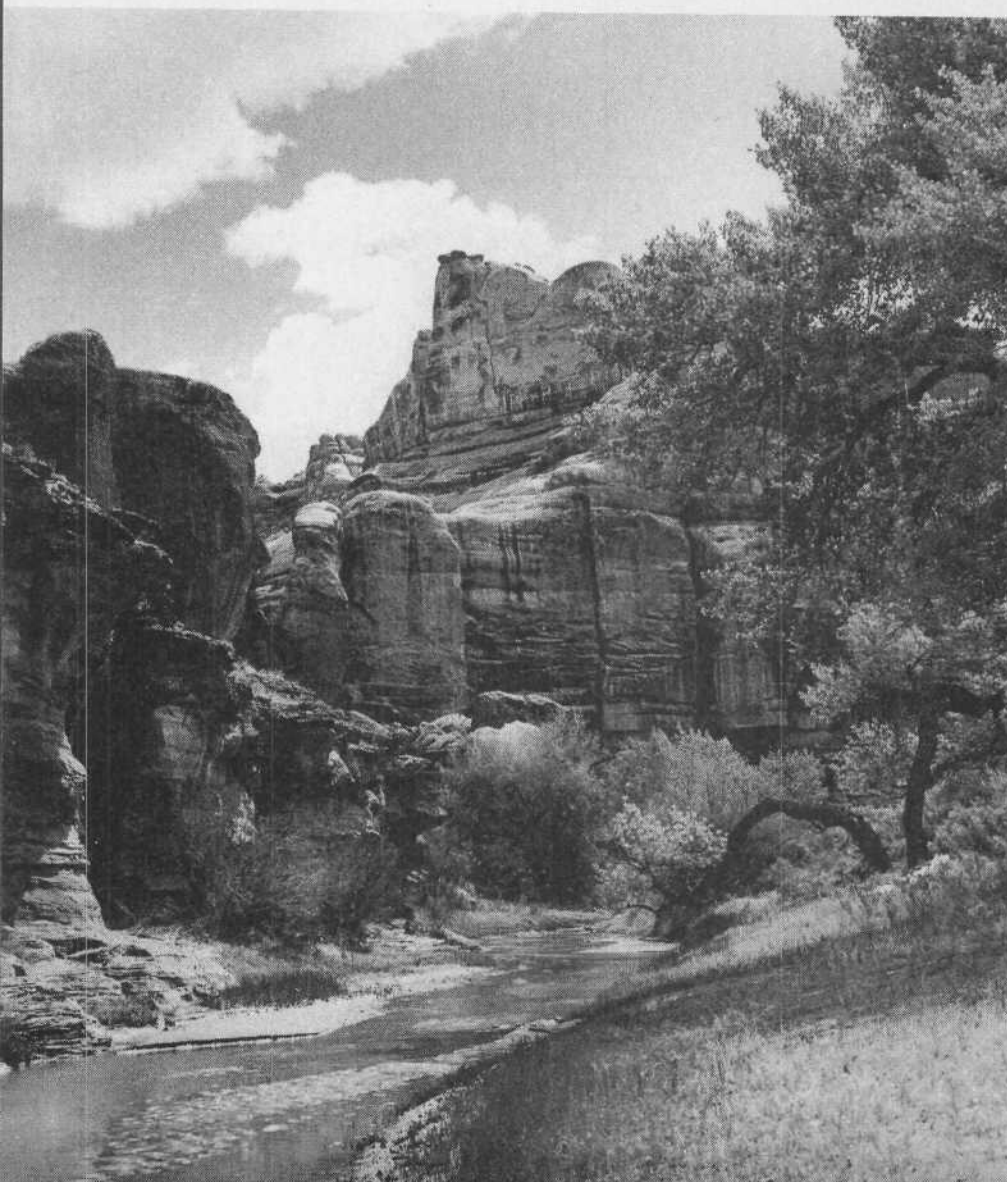
Canyonlands Tours offers custom backcountry services to almost anywhere within these five states, but specializes in standard tours penetrating the rugged, less traveled areas of Grand Canyon, Bryce, Zion, Capitol Reef and Canyonlands National Parks, as well as other canyon-plateau regions not within these parks.

Some of these tour routes can be traveled in one day, but most take longer and require camping out in remote wilderness areas. For example, it takes six days to sample Canyonlands National Park highlights—one day for a tour of the overlooks on lofty Island in the Sky in the northern part of the park, two days to traverse the spectacular White Rim four-wheel-drive trail at intermediate levels below the Island, plus three days for a quick look at the Needles, or southern, part of this vast canyon-wilderness park. It takes





*Typical Salt Creek Canyon trail. In the spring and following heavy rain, the creek has water in it. During the drier months, the stream bottom turns dry and soft making the going even tougher.*



another six days to see even the readily accessible parts of the Maze and Land of Standing Rocks in the western region of Canyonlands, the part that is west of the Green-Colorado river gorge.

Backcountry trips into areas outside of the numerous parks, monuments and recreation areas in southeastern Utah are also growing in popularity, as people return again and again to this unique, unspoiled and beautiful region, seeking out new adventures, new places to see. One such route offered by Canyonlands Tours is a two-day trip into the foothills of the Abajo Mountains, looping through the fascinating archeological sites of Beef Basin and also taking in the giant sandstone spans of Natural Bridges National Monument. Another is a five-day trek along one route followed by early Utah settlers, a route called the Old Mormon Trail.

Canyonlands Tours has offices in two locations, Moab and Monticello, both in Utah. Moab is in the heart of southeastern Utah's canyon country, between Canyonlands and Arches National Parks, and Monticello is 50 miles south of Moab with easy access to the Needles district of Canyonlands as well as other nearby scenic areas.

The Moab operation is run by a colorful character named Joe Lemon, who acts as driver-guide for smaller groups and heads up larger groups that require more than one vehicle. Joe's most popular trips are two one-day backcountry jaunts into Canyonlands National Park. One takes in the highlights of Island in the Sky, the infamous Shafer Trail switchbacks and a segment of the White Rim Trail. The other goes to the Needles district of the park, making the long and beautiful trip up Salt Creek Canyon to famous Angel Arch.

I recently made this last trip with Joe and found both trip and guide to be fascinating and colorful.

Joe Lemon, himself, provides the first

*This is typical Salt Creek country — lofty, water-stained sandstone walls, gnarled cottonwood trees and a lovely stream with grassy banks. A few steps from the Jeep trail anywhere and the canyon is as primitive and unspoiled as it was before mankind discovered its novel beauty.*



touch of color as you get acquainted with him during the 70-mile scenic ride between Moab and the Needles district of Canyonlands. Joe is a tough and wiry man of intermediate age (who proved to be in his mid-50's) and of mixed Cherokee-Irish ancestry. Both ethnic strains are visible in Joe's rugged, outdoorsman features.

Joe makes an ideal guide for exploring the backcountry of southeastern Utah. His parents moved to Rifle, Colorado, when Joe was very young and that part of Colorado was still largely untamed. As a teenager on his own, Joe moved to Moab, Utah, where he worked for 20 years as a cowboy, prospector, miner and salesman. During these years he accumulated a vast amount of knowledge about the surrounding backcountry. For the last 20 years Joe has put this knowledge to work as a guide, 18 of these years with Kent Frost's Canyonlands Tours.

When our tour reached the Needles entrance, we stopped to pick up our other passengers, a couple whose diction quickly revealed their deep-south origin. These two friendly people had tried earlier to penetrate the Needles country, on a short dirt road, using their car. This ill-advised attempt had resulted in a damaged transmission and immense frustration, so this time they had decided to "let Joe do the driving."

The trail to Angel Arch is certainly not difficult, or even very rough except in a few places, but it is quite long and requires a rugged, low-g geared backcountry vehicle of some sort and a skillful driver. The trail generally follows up Salt Creek, traveling in the sandy bottom of this desert-canyon wash and crossing the creek quite frequently. This presents two hazards to the unwary driver — soft, dry sand in many places, and soft, wet, quicksand in a few others.

This trip, however, was made in May, and was not plagued by dry sand because a late, wet spring had kept water flowing the length of this long mountain - to - canyon - to - desert - to - Colorado River gorge stream.

So we splashed along in several inches of water for mile after mile, and as we did Joe pointed out the various high-lights in the deep, colorful, winding canyon up which we were traveling. Rich, green vegetation filled the canyon bottom, while rounded red-and-white sand-



*This lofty tower and low window overlook Peek-A-Boo Camp Site in Salt Creek Canyon. This primitive campground has spring water, tables and pit toilets and can be reached only by four-wheel-drive or hiking.*

stone bluffs walled the canyon. Dozens, hundreds, of narrow, mysterious side-canyons branched off in all directions, and as we marveled at the intricate natural beauty of this passing panorama, Joe pointed out to us countless Indian cliff-dwelling ruins and petroglyphs, as well as a number of beautiful arches.

I had traveled Salt Creek Canyon several times before, but had missed most of the archeological sites Joe pointed out, proving that it pays to travel with a knowledgeable guide if you really want to see all this wild country has to offer.

As we finally turned into the side canyon where the Angel dwells, the trail got rough. Here, it traveled up a rocky, dry creek bed for most of the remaining mile to the end of the jeep trail. Once there, we grabbed our cameras and headed up the short foot trail toward magnificent Angel Arch.

Angel Arch is not the largest span in the arch-filled Four Corners region by quite a bit, but it is certainly one of the most beautiful and spectacular. The span formed as rock eroded away from a large sandstone fin that juts out from an even larger curved wall of the same red and white Cedar Mesa rock. From below, and from vantage points behind the span, Angel Arch stands silhouetted against the sky, revealing to the fullest advantage its immense arc of stone and angel-with-folded-wings shape.

We did not take the time this trip for the rugged hike up to the arch, but I know from past experience that human figures standing beneath Angel Arch are dwarfed to insignificance. They are hardly visible from the classic viewpoint near the end of the Jeep trail.

After photographing the Angel, and a tooth-shaped monolith at the viewpoint called The Molar, we reluctantly headed back down the canyon. The return trip was every bit as exciting as going up the canyon. New vistas opened up at every canyon turning, new arches were spotted and photographed, and Joe pointed out still other remnants of the ancient Anasazi Indian culture that had once inhabited this canyon and used its life-giving water.

Back at the park entrance, at Canyonlands Resort, we met genial Jay Pratt who offers the only commercial services and supplies available near the Needles district. We had earlier seen Jay's scenic-flight airplane, high above Angel Arch.

As we parted company, it was apparent that the southern couple's earlier frustration was now history. They had seen a part of the Needles, and in the company of one of southeastern Utah's most knowledgeable and colorful guides, Joe Lemon. And they left with the happy knowledge that to see an Angel, it is not necessary to die. □

# Going West with Raphael Pumpelly

by RUSSELL WAHMANN

**115 YEARS AGO, A YOUNG MINING ENGINEER TRAVELED FROM ST. LOUIS, MISSOURI TO TUCSON, ARIZONA. THIS IS AN ACCOUNT OF THAT TRIP AND IT IS ONLY ONE CHAPTER IN THE EXCITING LIFE OF A VERY REMARKABLE MAN.**

**R**APHAEL PUMPELLY was not the typical kind of bloke one would expect to find on the Arizona desert in the 1860's, but then Raphael Pumpelly was no ordinary man. When one thinks of the legendary prospector or miner, the vision of a crusty, grubby, hard-drinking type of individual is conjured. By contrast, Pumpelly was quiet, educated and refined.

Educated as a geologist and mining engineer at Freiburg, Germany, he was

thus endowed with the finest of established traditions and education.

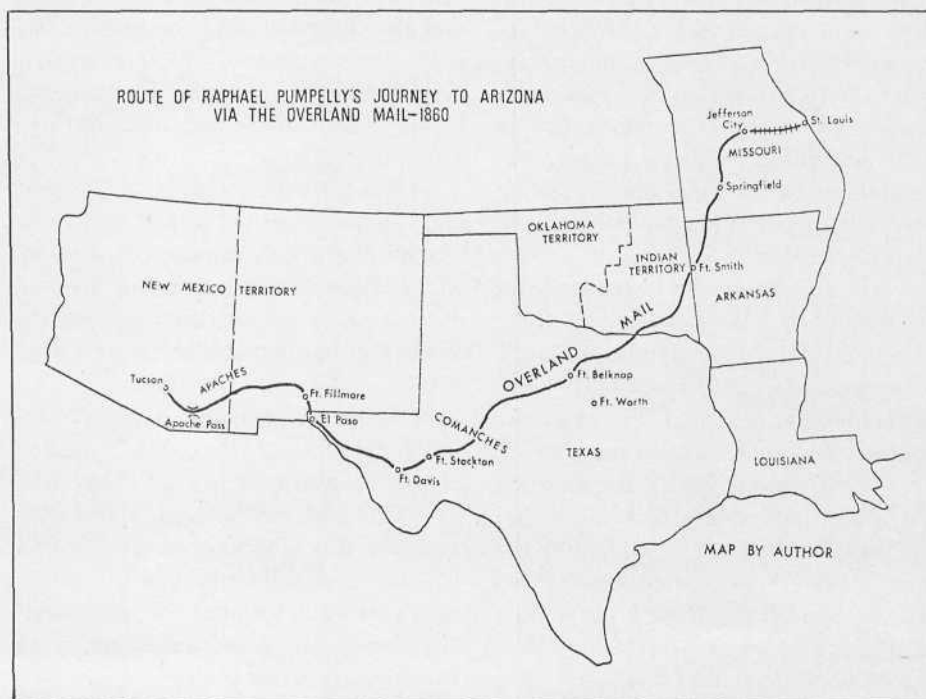
The experiences of a young American boy in Oswego, New York, his birthplace in 1837, would hardly seem to prepare him for his adventure in Arizona. But, Pumpelly was an exception. Frankly interested in everything about him — languages, social ways, or scenery — he met every new impression eagerly, instinctively gathered the good from it and passed on in search of further novelty.

Arizona in 1860-1861 was a land of hell and sudden death. A majority of its Anglo inhabitants knew no law save their own caprice; they were exiles from that portion of the frontier where laws could be enforced. Mexican peons constituted another part of the population, indispensable laborers, but oftentimes, dangerous cutthroats.

Into this lawless land came Raphael Pumpelly as mining engineer to be placed in charge of the Santa Rita mine between Tucson and Tubac. He was 24.

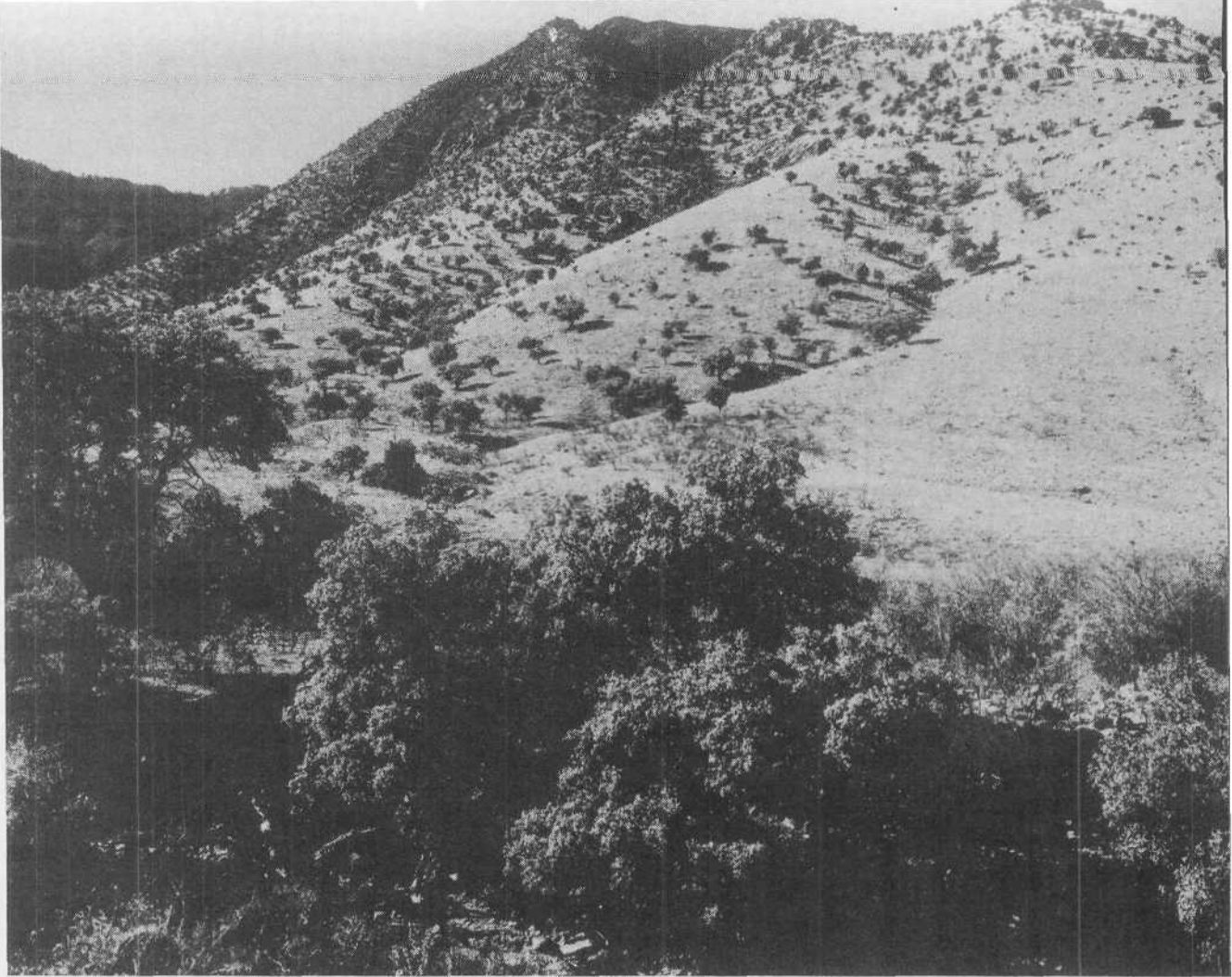
From his own pen, the trip from the East is described for us. Not only delightful to read, his writing provides us with a historic and geographic illumination of the times.

"In St. Louis on the 8th of October, 1860, I bought my ticket (from Syracuse to Tucson, per Overland Mail Stage, Waybill No. 7). I went by rail to Jeffer-





The Santa Rita  
Mountains  
near  
Pumpelly's  
Santa Rita  
mine.  
By permission  
from  
"Arizona's  
Natural  
Environ-  
ment," in  
Vertebrates  
of Arizona,  
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son City, then the westernmost end of the railroad in Missouri. This finished the first, and in point of time the shortest stage in a journey, the end of which I had not even tried to foresee.

"I secured the right to a back seat in the overland coach as far as Tucson, and looked forward, with comparatively little dread, to 16 days and nights of continuous travel. But the arrival of a woman and her brother dashed my hopes of an easy journey at the very outset, and obliged me to take the front seat, where, with my back to the horses, I began to foresee coming discomfort. The coach was fitted with three seats, and these were occupied by nine passengers. As the occupants of the front and middle seats faced each other, it was necessary for these six people to interlock their knees; and there being room inside for only 10 of the 12 legs, each side of the coach was graced by a foot, now dangling near the wheel, now trying in vain to find a place of support. An unusually heavy mail in the boot, by weighing down the rear, kept those of us who were in the front seat constantly bent forward, thus, by taking away all

support from our backs, rendering rest at all times out of the question.

"My immediate neighbors were a tall Missourian, with his wife and two young daughters; and from this family arose a large part of the discomfort of the journey. The man was a border bully, armed with revolver, knife, and rifle; the woman, a very hag, ever following the disgusting habit of dipping — filling the air, and covering her clothes with snuff; the girls, for several days overcome by seasickness, and in this having no regard for the clothes of their neighbors; — these were circumstances which offered slight promise of pleasure on a journey which, at the best, could only be tedious and difficult."

The lack of comfort did not diminish his sense of humor.

"Before reaching Fort Smith every male passenger in the stage had lost his hat, and most of the time allowed for breakfast at that town was used in getting new headgear. It turned out to be a useless expense, however, for in less than two days we were all again bareheaded. As this happened to the passengers of every stage, we estimated that

not less than 1,500 hats were lost yearly by travelers for the benefit of the population along the road."

The route, through the southern part of the Llano Estacado between the Brazos and Pecos Rivers was Comanche country. Pumpelly continues:

"Here we were constantly exposed to the raids of this fierce tribe, which had steadily refused to be tamed by the usual process of treaties and presents. They were committing serious depredations along the route, and had murdered the keepers at several stations. We consequently approached the stockade station-houses with more or less anxiety, not knowing whether we should find either keepers or horses. Over this part of the road no lights were used at night, and we were thus exposed to the additional danger of having our necks broken by being upset.

"The fatigue of uninterrupted traveling by day and night in a crowded coach, and in the most uncomfortable positions, was beginning to tell seriously upon all the passengers, and was producing in me a condition bordering on insanity. This was increased by the constant

anxiety caused by the danger from Comanches. Every jolt of the stage, indeed any occurrence which started a passenger out of the state of drowsiness was instantly magnified into an attack, and the nearest fellow passenger was as likely to be taken for an Indian as for a friend. In some persons, this temporary mania developed itself to such a degree that their own safety and that of their fellow travelers made it necessary to leave them at the nearest station, where sleep usually restored them before the arrival of the next stage, in the following week. Instances had occurred of travelers in this condition jumping from the coach, and wandering off to a death from starvation in the desert."

Various legs of the journey were characterized by travel at great speed, with only half-broken teams. In these cases the driver had little or no control over the horses other than the ability to guide them. Nothing but perfect presence of mind on the part of the driver could prevent accidents. Even this was not always enough, as was proved by a stage they met in which every passenger had either a bandaged head or an arm in a sling.

Fatigue and exhaustion was beginning to take its toll as Pumpelly describes further dangers:

"At El Paso we had hoped to find a larger stage. Being disappointed in this, I took a place outside, wedged between the driver and conductor. The impossibility of sleeping had made me half-delirious, and we had gone but a few miles before I nearly unseated the driver by starting suddenly out of a dream.

"I was told that the safety of all the

passengers demanded that I should keep awake; and as the only means of effecting this, my neighbors beat a constant tattoo with their elbows upon my ribs. During the journey from the Rio Grande to Tucson my delirium increased, and the only thing I have ever remembered of that part of the route was the sight of a large number of Indian camp-fires at Apache Pass. My first recollection after this, is of being awakened by the report of a pistol, and of starting up to find myself in a room, where a number of people were gambling. I had reached Tucson, and had thrown myself on the floor of the first room I could enter. A sound sleep of 12 hours had fully restored me, in both mind and body.

"I got up. No one noticed me. I looked on a novel scene. There were two or three men neatly dressed, and with delicate hands, who were dealing out cards. Their bearing was quiet and easy. The rest were a rough-looking lot of white men with unclean beards, two of them in a quarrel that might bring more shooting.

"I walked out into the brilliant sunlight. Houses built of sun-dried mud bordered a vista that opened upon a vast, yellow-brown, desert plain; and, beyond, a mighty barren range of wonderfully sculptured mountains rose with a lofty majesty that cast its glamour over the whole scene.

"I had no remembrance of having eaten for a week. So when I saw some men hurrying to a house where a man with a revolver stood ringing a bell, I turned to enter. The man stopped me.

"'Fifty cents first!' he said, holding

out a hand. There was jerked beef, and beans, and some things they called bread and coffee. You ate what was pushed to you; the memory of that pistol acted as a persuasion.

"The curtain had risen on a new act in the drama of my life; Arizona was before me with its wide range of types of man and Nature."

He arrived at the Santa Rita in late October traveling from Tucson by way of Tubac. Behind him were Freiburg, Vienna, Rome and Paris; Corsica also; and if in that place he had lived among outlaws, they were only so in opposition to the established order. Here was a land without law, where a man's only safeguards were physical strength, cool courage, and alertness.

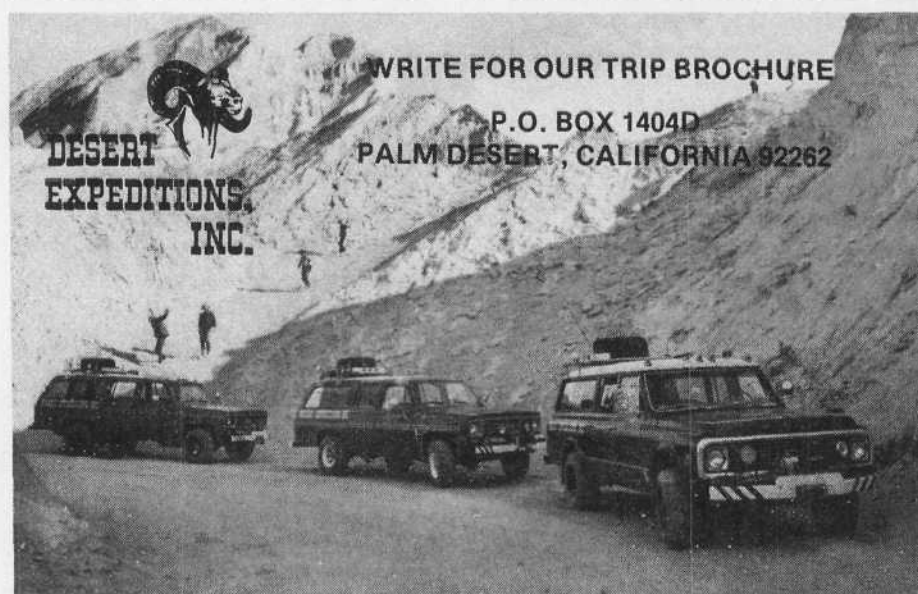
Pumpelly possessed these qualities in high degree. He could ride and shoot, but, most important, he let nothing escape his observation. Once, while working, he noticed his cat strangely sniffing the breeze. Suspecting ambush, he reacted in time to avoid being killed by the same Indian who had just killed his associate, H.C. Grosvenor. Nearby hills were later named for his friend. He himself was one of the very few mining engineering who escaped massacre.

The problems presented by the geologic structure of the mine and the smelting of the ores fully occupied the young engineer-geologist during his first few months. The Santa Rita was reputed to have yielded fabulous wealth to the Spaniards. It was expected to yield accordingly to the new American company, which like many others, expected to acquire riches for nothing.

The working capital was limited and the richness and extent of the ores was exaggerated. In the Spring of 1861, coinciding with the outbreak of the Civil War, the soldiers were withdrawn, leaving the ranchers and miners to the fate of extermination which had been sworn by the Apaches.

Pumpelly faced an intricate complexity of problems; geologic and logistic. In his words:

"We needed fuel, fireproof furnace materials, machinery and power, and the supply of these furnished by Nature in Arizona was of a kind to necessitate a great deal of trouble and experimenting when taken in connection with the peculiar character of our ore. The season was promising to pass without our hacienda





being troubled by Indians, when one morning our whole herd of 40 or 50 fine horses and mules was missing. Several times during the remainder of the winter and spring we were attacked by Apaches and our mines were the scene of more fighting than any other part of the Territory."

The Mexicans, armed with rifles to withstand Indians, were scarcely less dangerous. In addition, the furnaces, standing on a point between two ravines, lighted up every object near them and exposed the workers constantly to the fire of the Apaches. Pumpelly's smelter chief was shot and he was obliged to finish the separation of the silver and lead almost without sleep for 50 hours or more.

"The two other Americans, revolver in hand, kept an unceasing guard over the Mexicans, whose manner showed plainly their thoughts. Before the silver was cool we loaded it. We had the remaining property of the company, even to the wooden machine for working the blast, in the wagons and were on the way to Tubac, which we reached the same day. Here, while the last wagon was being unloaded, a rifle was accidentally discharged and the ball, passing through my hair above the ear, deafened me for the whole afternoon. Thus ended my experience of eight months mining in an Apache stronghold."

Unable to return home through hostile country, or to travel into Mexico, he was driven, instead, through the desert to Yuma. No boat could reach the port at that time. He continued on, instead, into California, finally reaching San Francisco in the Autumn of 1861.

Pumpelly went onward from his Arizona experience to a distinguished and

remarkable career. He conducted mineralogic research in China, Mongolia and Japan. Driven out of Japan by a Civil War, he arrived home in time to see the ending of the American Civil War. The post-war period was intensely stimulating to Pumpelly and he was intrigued by the vast mineral wealth native to the country. His career took him to the Wisconsin Superior iron ore deposits, and the Gogebic Iron ranges of Minnesota. He spent a period as State Geologist of Missouri and two separate tours of duty with the U.S. Geological Survey. With the latter, he distinguished himself as Chief of the New England Division unraveling the complex structure of the Green Mountains.

In 1881, after completing the mineral industries volume for the Tenth United States Census, he joined the Northern Transcontinental (Railway) Survey to produce an inventory of geology, soils and timber lands of the vast northwest empire.

In 1915, his wife passed away. He sought solace and comfort from that which he knew best; Nature. This remarkable man, who had traveled around the world and knew well its secrets, who, in the course of his arduous efforts and through the knowledge gained, had acquired a handsome fortune; this gentle, loved and loving man, now approaching his eightieth year sought the healing influence of the Arizona desert.

Allowing Pumpelly to speak from his reminiscences again:

"Now, after half a century, Tucson was a flourishing city with fine streets, luxurious hotels and plate-glass windowed department stores. I was a dazed Rip Van Winkle. Was it only last night that I had slept on an earthen floor to

wake up at the sound of shots and find myself among a lot of players who were dodging the bullets of two gentlemen, each casting aspersions on the other's character, and on the virtue of the other's mother? This vision was still before me when I registered at the hotel."

With the aid of a Mexican who remembered him, he found the grave of his former associate H.C. Grosvenor in a dense growth of brush, and had a stone cut from a white volcanic tufa placed on the site.

Pumpelly writes that "with our entrance into Arizona a new spirit seemed to enter me." To him the desert meant all things. Alone in the great solitudes of mountain heights, he felt a subtle influence lifting him to a medium beyond the bounds of self to a clearer perception of values in life. On the lofty heights and the desolate deserts he felt, as have many another, the greatness of Nature's mysteries. □



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# Kayaking in the Desert?

by BOB BARNES

*Arthur: — It's a custom we have here. England, you know. It's the time for flower gathering.*

*Lancelot [stunned]: Knights gathering flowers, Your Majesty?*

*—Camelot, Act I, Scene 4*

**M**Y BOAT slid gently forward, twisting slightly with each change in the subtle current, moving silently in the midst of the music of scores of white-winged doves gossiping in the upper branches of the mangrove trees that formed my diminutive world. It was a

small world: a wall of green leaves on each side and a floor of clear flat water varying in depth from a few inches to several feet. To the front and rear of the leaf-lined canyonette turned and twisted, closing off the view after but a few yards. The effect was very like being in the interior patio of a traditional Mexican house: private, lush, quiet, peaceful — a place to relax, to restore, to become renewed in. It seemed wholly appropriate for this to be taking place in the state of Sonora, Mexico — a wonderland of contrasts large and small.

Lost in my reverie, enchanted by the magic of this mini-world enveloping me, I was unprepared for the kaleidoscopic contrast about to come. The cool floor of my room spread itself out; the walls moved away; the drift, with an occasional pull from my paddle, moved me around another turn. In a few feet and a few seconds another reality emerged: the blue waters opened into a small lagoon. Across it the brown, the red, the natural gold of the desert jolted me with the timelessness of broiling, searing heat, of naked rocks and viciously wicked thorns, of the ingenuity and adaptation of the ocotillo, the cardon, the mesquite. Like Lancelot, I was incredulous: I was kayaking in the desert! On one side the scorpion, the jackrabbit, the coyote's world; on the other the mangrove-lined, time-hewed canals populated with doves, egrets, sandpipers, clams, crabs, rays and fish.

These "esteros" have been described as "negative estuaries": a series of ever-narrowing water passages filled and drained twice a day by tidal action from the Gulf of California. At full high tide they sparkle and dance under the desert sun; the fish that come in with the water leap high; the blue waters mirror the clear desert sky. It is at this high tide the boating is best. The wide streams wind on and on seemingly without pattern, diminishing until even a kayaker

*The quiet esteros of Mexico's mainland provide many a perfect spot to kayak and observe the abundant marine life and shorebirds.*







ships his paddle and pulls himself along by grasping the brush walls on each side as the channel converges to nearly nothing. Some of the passages wind back on others. Some dead-end in only a few yards. Some pass by each other in great ox-bows separated by only a yard or two of brush.

But what a change when the tide is out! The glistening murmuring ribbons of water leave behind thousands of yards of sand flats, mud flats and tide pools. Shore birds move in to occupy this newly-unwrapped territory. Gulls, terns, sandpipers, egrets, herons mix on a nonfraternizing basis to exploit this bargain-basement supermarket of food, searching for small crabs, sand eels and water-abandoned tidbits. Pools that were covered with four or five feet of water become only a few inches deep: storehouses of nourishment for those creatures armed with the twin keys of knowledge and skill to open their doors.

One fine April day I was caught out by the retreating tide and while dragging my kayak behind me through the few inches of water that remained stopped to bring home a bit of supper: 17 eating-sized crabs, caught with the two halves of the kayak paddle used as "fishing" gear. Other times, armed with a barbed pole and a burlap sack, it has been easy to catch luncheon-for-six in a half hour or so. Clams are available for those armed with a steel-tined rake to turn up the low-tide exposed sand flats. For those who are fishermen the high tide will have brought with it various fish such as mullet, needlefish and puffer. This *must* be an outlying region of Camelot: fresh seafood, peaceful waters to explore, restful vistas to relax the eyes and mind, sea breezes to cool the body!

By taking advantage of the tides an explorer can move to more distant parts of the "estero" riding the outgoing tide toward the mouth and the incoming tide

back or the reverse when moving deeper into the maze. Even at lower tide levels the current is such that paddling against it is not restful. To be caught out trying to work back against the main incoming or outgoing tide is futile.

The incoming tide can be spectacular. After several hours of apparent inactivity, where the primary actors on the sandy center stage have been the birds and the fiddler crabs, the water will start to rise. Very swiftly the rise becomes an engulfment of the basins, an intruding that transforms the dull mudflats into shimmering lagoons of fast-moving blue water. The current can be very swift: the water level can change as much as five feet in as little as 20 minutes. Don't get caught out without a boat or raft if you are going to be far from camp near the time of the incoming tide.

Although there are esteros at Bahia Kino (Estero de La Cruz) and further south at Tastiota, the only ones known to

the author to have these alluring mangrove canyons are those north of Bahia Kino. Four are spaced over a 50-mile stretch of the Sonoran Coast opposite Tiburon Island. The most easily reached is at Punta Santa Rosa, about 15 miles north of Bahia Kino. Take the graded, graveled road to the right at the "airport" sign in Kino Nuevo and stay on it for 13 miles as it moves behind the lava crags and then northwest along the coastal area. At the 13-mile mark the mangrove trees at the tip of the point can be seen from the main road. An unmarked but well traveled dirt road goes left, moving sinuously down the long gentle slope out to the flats. At the crossroads on the saltbrush flats go left again; a half mile will bring you to one of several places to camp next to the water. There are half a dozen such camping spots nearby; some have natural ramps that make it easy to hand launch a small boat at high tide.

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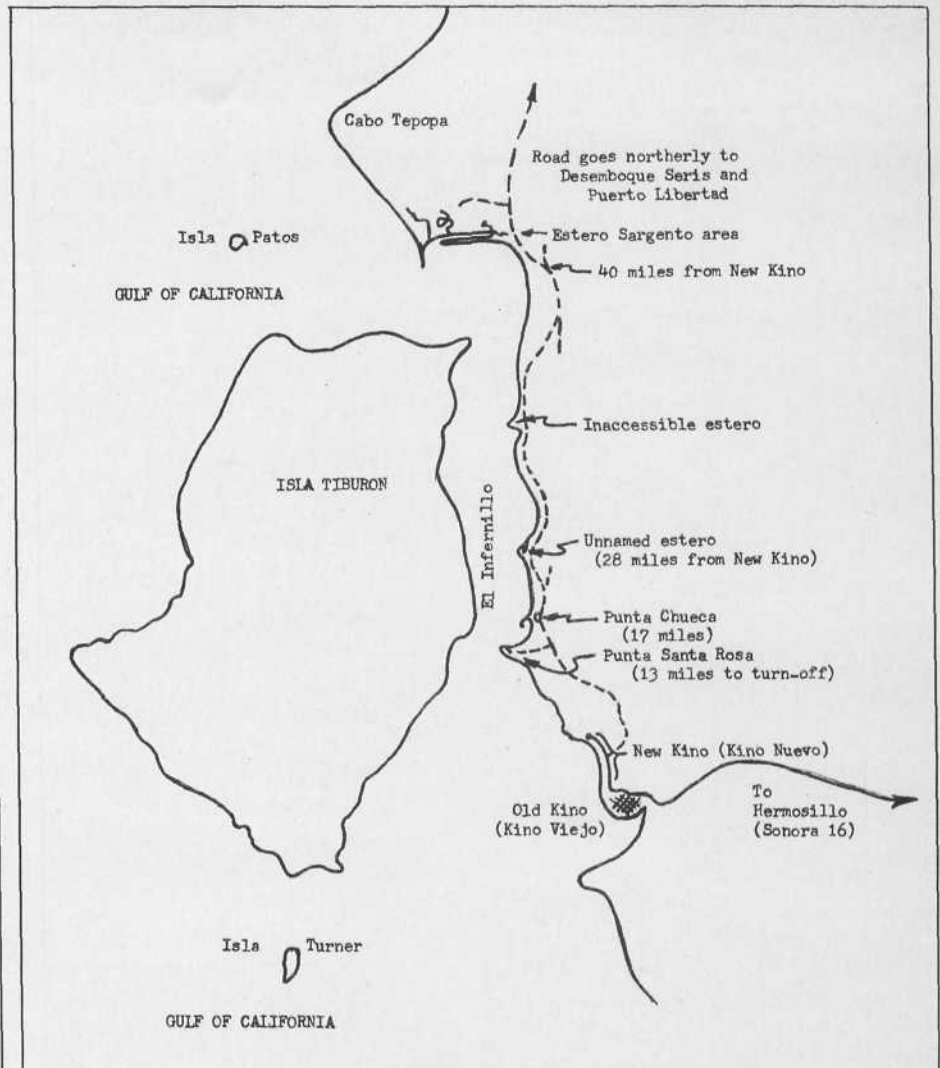
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Punta Santa Rosa is well frequented by boaters and fishermen. If your liking is for more solitude pass up the Punta

Santa Rosa turn-off and go four more miles to the Seri village of Punta Chueca. The road leading northerly along the coast turns slightly right and becomes an airstrip runway just before entering the village. (Please check for approaching aircraft before turning onto it.)

A few miles beyond the end of the airstrip the traveler is presented with a truly breathtaking view: Tiburon Island on the left, the Infernillo (strait) between Tiburon and the continent and the desert sweeping down to the water's edge from the Sierra Kunkaak (the Seri's name for themselves) to the right of the roadway. Eleven miles from Punta Chueca (28 from Bahia Kino) look for the dark green of the mangroves on the left; there are a number of places to camp next to the water. About a mile beyond (at this writing) the road re-construction ends; from here the road winds its snake-track way among the ocotillo-spined flats without benefit of bulldozer.

A few miles further on another sand spit thrusts its way into the Infernillo, but the estero is at the tip and not ac-



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cessible to vehicles. A boat could be launched directly into the strait from the south side of this unnamed point, but it would have to pass around the tip to explore the estero.

About 35 miles from Bahia Kino the road climbs the shoulder of the hills again. At 40 miles it starts to leave the hills and drops to the floor of a broad flat. Coming down the hill the mangroves of Estero Sargento (the largest of the four) can easily be seen as a mass of dark green between the sandy gold of the desert and the transparent blue of the Infernillo. About three miles from the start of the flat watch carefully to the left for glimpses of open water; the estero can be reached directly at this point. Be careful of a combination of high tides and strong on-shore winds: they can combine to make a water-logged desert floor that can cause trouble. Of course, if you like to dig yourself out of mud?

About two miles northwest the grade forks; the left fork will lead in four or five miles to another camping area at the mouth of Estero Sargento. Depending on the high tide situation any of several road combinations can lead there; thus no specific directions are given.

The best months to explore these areas are the cooler ones: October to April. The other half of the year is much hotter even though the on-shore breeze is nearly always turned on, but that is a minor problem compared to the *jejene* ("Hey-hey-nay") fly. This is a stinging fly (or gnat) that makes life unbearable from dusk to sunrise during the hot months. It will slip through ordinary window mesh screening, making camping within a mile or so of the esteros utterly impossible. Summer sleeping must be done well away from the mangroves.

The area of Punta Santa Rosa to well north of Estero Sargento is owned and controlled by the Seri Indian tribe. They have begun to charge for the "right to enter" the Sargento Estero area, charging \$3.00 (U.S.) per vehicle but have not — yet — been specific about the length of stay nor number of times of entry and re-entry for the same fee. They have not been charging for camping at the other esteros as of this writing.

Bahia Kino is reached by 65 miles of good paved road (Sonora 16) going west from the state capitol of Hermosillo, and has all the services a traveler in rural

Mexico would expect, either in Kino Viejo (Old Kino) or Kino Nuevo (New Kino). Old Kino is reached first, where the only gas station is the first structure by the road. Kino Nuevo is strung along the next seven miles, to the end of the highway. Several hotels and motels, trailer parks, bars and grocery stores are scattered on that seven miles. There is a concrete-paved boat launching ramp just beyond the end of the pavement. Except for two very poorly stocked stores in Punta Chueca, Kino (old or new) is the only source of supplies. Take heed!

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# Great Basin Pocket Mouse

by K. L. BOYNTON

SOME LEARNED SCHOLAR once said that when Old Mother Nature designed the pocket mouse, she outdid herself. The result is odd enough: a bunched little mouse-like creature who is longer in the hind legs and has what looks like an out-sized head. The head size is due mainly to the shape of the skull itself, which is quite large in the region behind the ears. But also there is a big fur-lined pocket installed in each cheek, and these add to the appearance of head size.

There is no doubt what these face pockets are for. They're satchels for carrying groceries. Exactly what Ma Nature had in mind with the inflated skull region is still being investigated. About all that is known so far is that it plays a part in body weight balancing in pocket mouse locomotion, and if it works something like the similarly inflated skull region in his cousin, the kangaroo rat, it may indeed contribute to the acuteness of his hearing in certain sound ranges.

Pocket mice come in assorted sizes. *Perognathus parvus*, the hero of this piece, happens to be one of the bigger ones, measuring some seven inches from nose tip to tail end. While various species of pocket mice are to be found throughout the arid stretches of the West, this fellow has been dubbed the Great Basin Pocket Mouse as his main

stamping ground is throughout that region from northern Utah and Idaho, Washington, Oregon, and down into northeast California. His choice of residence should add to his fame and glory. Desert living anywhere is tough, and Great Basin desert living apt to be even tougher due to the big daily and seasonal variations in temperature, with summer swings far above 100 deg. F., winter dips far below freezing, and snow and prolonged cold being standard in the northern stretches of the range December through February.

Like others of his ilk, the Great Basin Pocket Mouse dwells underground. His burrow is especially complex, consisting of a surprising array of a main tunnel, side tunnels, storage rooms and pantries, a latrine and a bedchamber. The whole set-up may be some 14 feet long, and in the best of desert engineering principles, located a good three to five feet down, well below the scorching or freezing temperature of the surface.

In this subterranean apartment, the pocket mouse lives quite by himself, taking a dim view even of the ladies except, of course, during the proper social season. In fact, so anti-social are these mice in general, that if two are caged together, one or the other is bound to be very dead in practically no time at all. Not that these fellows are really cusses



by nature, being gentle enough if caged by themselves, their belligerence when in contact due undoubtedly to the severity of their natural environment and the intense competition for scarce food. Under such circumstances, defense of home burrow and territory may well have evolved as absolutely essential for survival. Nor is there actually time, for that matter, for conviviality at dusk and during the night when these little animals are above ground. Every moment then is filled with danger with so many snakes, owls, coyotes, and bobcats around with a dinner of pocket mouse on their minds. Mouse-time must be spent quickly and well, not only to find enough to eat that day, but to gather up and take home to store.

The pocket mouse, you see, is a seed eater by trade, a collector of provender and operator of his own freight service. In itself, the job of hunting and gathering seeds is time consuming, involving finding the plants and searching the desert sands for the grains. He does have a speedy loading technique: balancing along on his hind legs with his head close to the ground, he uses his hands to search through the sand for seeds, stuffing them into his face pockets at an astonishing rate. Loaded full, he's off for home in a galloping four-footed gait, his long back legs propelling him forward in tremendous leaps. Once in his storehouse, he uses his hands to push and manipulate his face pockets, unloading his cargo. Then he's out and gone again for another shipment. He needs no water, sufficient moisture being manufactured within his body metabolically from the food he eats.

For a long time it was believed that seeds with an occasional green stem formed the only diet of pocket mice. Then anatomist E.W. Jameson, Jr., making a study of a batch dwelling in California, found that in April there the face pockets of the animal would be full of seeds to be carried home, but its stomach was apt to be full of insects, in this particular case, mostly caterpillars apparently eaten on the spot.

Since, however, the food of these mice is mainly seeds of desert plants and annual grasses and flowers, what happens rainwise is very important. No rain, no seed germination. Then, indeed, is it increasingly difficult to find food. The

mouse must spend a much longer time topside, shifting and sifting the sand, moving from spot to spot to find any. Much longer is required to build up the stores at home.

The reason why possession of a well-stocked larder is so important to the pocket mouse is that his body machinery works so fast he needs almost a continual supply of food. Even under favorable temperature conditions a pocket mouse, if active in his burrow, would need snacks to carry him through the day until he could get out and forage at night. But more than this. The food storage habit works in conjunction with physiological adaptations these animals have developed to meet high and low temperature stress. Biologists G.W. Bartholomew and Tom Cade, studying *P. longimembris*, a cousin of our hero, found that when its body temperature reaches a certain height, the animal slides into a light torpor. His metabolism slows way down, and his energy requirements are minimized. This torpor may not be of long duration, for his body cooling enough wakens him and he must eat. Here indeed the storehouse is of value. With combined summer torpor to save energy and having some food at hand, the mouse can survive the long dry scorching months when temperature stress is too great, and food so scarce outside.

Wintertime low temperatures and snow on the ground in the northern parts of the range, make food foraging impossible. Low body temperature puts the mouse into a torpor deeper and longer lasting than that of summer, and in this energy-saving state it can sit out the long cold period safely ensconced in its burrow. Waking, it finds its food store handy, and it is upon this that it lives until the outside grocery is open for business again.

What with desert-beating capabilities like these and because they are continually coming up with something new, pocket mice continue to be of much interest scientifically. The little fellows themselves are fine assistants to researchers. Ninety-five percent of the mice in traps today are apt to be in the traps again tomorrow, munching away on the seeds provided. This is a very accommodating state of affairs making possible quite a thorough study of their habits, physiology and characteristics

under field conditions.

The team of Thomas O'Farrell, Richard Olson, Richard Gilbert and John Hedlund, working with a population living on the Hanford Atomic Reservation in Washington, for instance, captured 1,857 individuals some 14,074 times. The end result of this was that the scientists got to know the mice pretty well and the mice got to know the scientists pretty well, and together they put out a report that just appeared in a scientific journal with a lot of new information in it.

It seems that up there in Washington, when the winter begins to taper off, the first to come out of their winter torpor and appear above ground are the teenage males (last season's youngsters). This is not because they are early risers, but probably because they weren't good enough at putting a store of food together last fall. Hence they did not have enough to get them through the entire winter. Forced out too soon, only the hardiest find enough to eat and escape being eaten themselves by predators always about.

Next to appear above ground and with surprising date regularity are the adult males, punching in exactly on or within a day or so of March 26. Biologist Kenagy, viewing this phenomenon, had an idea that maybe the vernal equinox might have something to do with waking the animals and bringing them to the surface. But O'Farrell & Company vote for the warming up of the soil, citing the fact that one extremely cold year of their study the ground stayed frigid very late and the appearance of the gentlemen pocket mice was delayed a month.

The ladies always put in an appearance a month later than the gentlemen, checking in April 26 if circumstances are normal. This is not due to a female allergy to being on time, but caused by their smaller size. They find it harder to keep warm and hence need a warmer soil to bring them out. It could also be that the ladies were so busy so late in the fall winding up family raising chores that by the time they got their larders stocked up, the males had already long retired for the winter. Only by emerging later in the spring could the females then have a full torpor span. Something like this happens in woodchucks where the ladies, slower at putting on fat, go into hibernation later than the males, and emerge later in the spring.

Naturally enough in pocket mouse circles, once out, the first on everybody's program is a general feeding up and replenishing of storehouses with food supplies hopefully becoming more available from fall germination and early spring growth. Now the population is ready for the big social season, the success of

which is absolutely contingent on the food situation. In a year of high plant production, all the females will be pregnant, and two, possibly even three litters produced apiece with some five young per batch. The breeding season will be long, running from April through September. In extremely bad years the season is short. One litter per female is good; no litter, par. Gestation takes 21-25 days, the male young not breeding until the following year, the young females breeding in the year of their birth only if environmental circumstances are especially lush. In such a case, the population may increase fivefold in a single season.

The animals need some 60 to 90 days to get their stores in and the most favorable time for this is April through June. The tribal custom of maintaining home ranges helps. The gentlemen, being bigger, need more food, and hence more space to find it in. Besides, they go looking for brides. So their territory usually has a radius of about 60 feet. The smaller female has a home range radius of only some 43 feet. The sizes of both may fluctuate with the food situation: bigger in poor times, smaller in times of abundance, but the center of activity — around the burrow — remains the same.

That the pocket mouse knows where home is was neatly demonstrated by three characters taken to the lab temporarily for weighing. They escaped

during the process. All three got safely back home as subsequent captures showed, one having traveled 820 feet to do so. In Harold Broadbrook's homing test with 10 deermice and 14 pocket mice in Oregon, none of the contestants made it back from one-half mile away. When the release point was reduced to a quarter-mile, however, three deermice made it, but only one pocket mouse. Viewing this poor score, Broadbrook concluded that the pocket mice really had a tougher time reaching their individual homes mainly because they had to cross hostile territory defended by other pocket mice. The deermice apparently don't have as much trouble either with the resident pocket mice, or among themselves.

Among the population of pocket mice such as this in Washington, there seems to be a kind of time and space isolation by sex and age, based on the burrow-home range system. The size of the population while fluctuating some, remains relatively stable year to year. Because pocket mice are able to sit out both high temperature and cold temperature stress periods in torpor, and long periods without food if in torpor, and because they are very long lived, there is always a backlog of potential breeders around to keep the old numbers up.

The burrow is the key to the whole thing. And what zoologists don't know and wish they did is: what goes on day by day in the pocket mouse's underground castle? Some digging, certainly and housekeeping for burrow systems are enlarged and kept neat. The pocket mouse himself is particular about his appearance, indulging in frequent dust baths and fur fluffing. Is a lot of time spent daily in torpor as energy saving and prevention of moisture loss? Even under favorable temperature conditions?

One thing biologists do know for certain: no pocket mouse time is wasted entertaining visiting relatives or hobnobbing with the neighbors. Far from having a welcome mat displayed, the doorway of a pocket mouse abode is kept plugged up tight. From the present looks of things, all this home-life information biologists are pining to have is going to stay shut up inside. That is, unless the pocket mouse tribe suddenly becomes hospitable, an event viewed by realists among scientists and mice alike no doubt, as being extremely unlikely to happen. □

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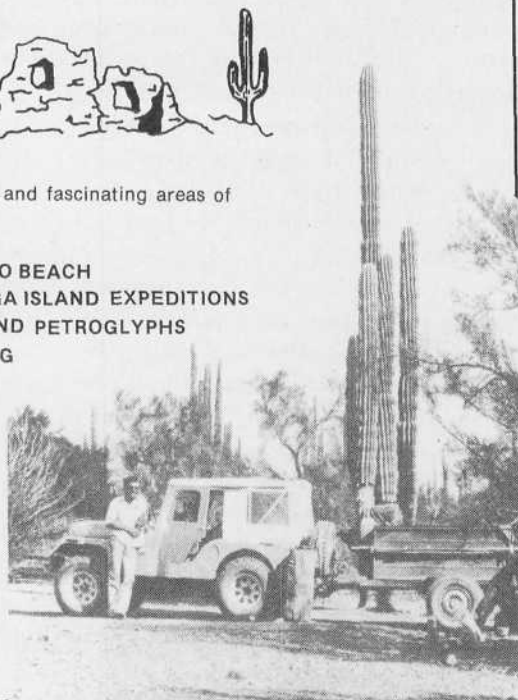
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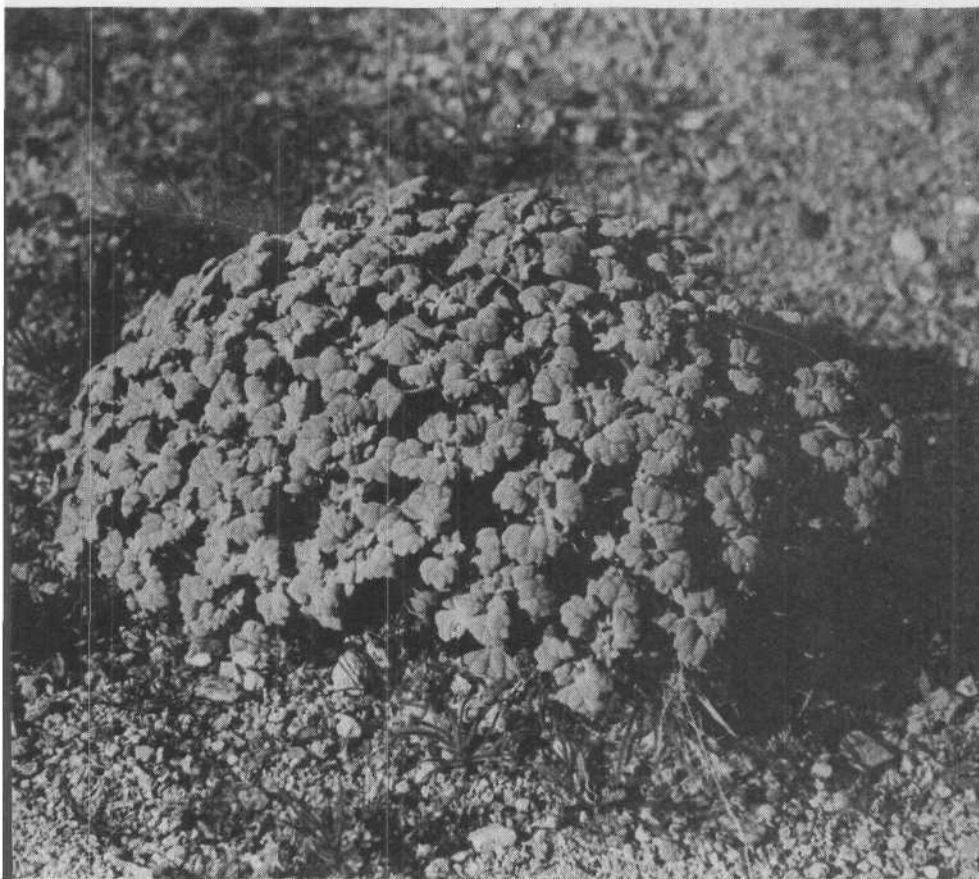




# Desert Plant Life

by JIM CORNETT

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**F**ORTUNATELY, THE Desert Velvet is only a few inches high—its powerful turpentine-like odor would be unbearable if it grew any closer to our noses. The strong smell comes from the leaves and stems of this plant. If these parts are crushed in one's hand the odor is particularly disagreeable.

Desert Velvet, *Psathyrotes ramosissima*, is a low, branching herb easily identified. Mature plants seldom reach eight inches in height and are very compact. The gray-green leaves are broad and round, forming a small shell over the entire plant. They appear soft and velvet-like and are arranged in an alternate manner on the stems.

Velvet Rosette, as it is also known, blooms in a curious manner. Most plant species bloom in a particular season or seasons. The Desert Velvet blooms any time of year seemingly without regard for the weather which is important to most plants. One will encounter the yellow to purplish blossoms of this common

annual throughout the year, but a bit more frequently in the spring.

The Desert Velvet is a member of the Southwest's largest plant family—Asteraceae, or Sunflower Family. Many well-known flowers belong to this group including Rabbit Brush, White Aster, Desert Sunflower and many more. In the Southwest all members of this family are herbs or shrubs and most possess multi-flowered heads. (It is important to remember that frequently in the Sunflower Family what appears to be a single flower in reality is many smaller flowers.) The ovary is inferior (situated immediately below the flower) and produces only one seed.

Found throughout the Mojave and Sonoran Deserts of California, Nevada, Utah and Arizona, the Desert Velvet prefers hard-packed soil below 3000 feet.

The name "turtle-back" is occasionally given to this plant which some say resembles a tortoise shell. Perhaps it does, if we throw in a hearty imagination! □

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ed by the volunteers as a result of years of use by desert recreationists. They also supplied fresh water units, portable generators and floodlights for nighttime illumination. The Helitack team from the Center maintained a helicopter search and rescue capability that, fortunately, was not needed.

Recreational Area cleanups are not something new to the BLM. However, it is seldom that one on such a large scope as the Rand cleanup comes off as trouble free and efficiently as this did. The volunteers in their dune buggies, four-wheel-drives and motorcycles scoured 43,000 acres!

"The job of manpower coordination was supplied by members of the Bakersfield District BLM," according to Dick Harlow, Inyokern Resource Area Manager. "Thirty BLM people spent the entire weekend, on a volunteer basis, involved in the project."

"Of course," Harlow continued, "without the unfailing labors of the people from CORVA, MORE, and all the unaffiliated volunteers, our dream could never have become the reality it is. We are all very grateful to them. The desert is now a more beautiful place because of their help."

# Desert Cleanup

**Editor's Note:** It is not our policy to publish press releases verbatim, but this is an exception. The people who made the Rand Open Area cleanup a success truly deserve public recognition, as do the businesses who supported the program with merchandise prizes. My hat is off to all those thoughtful volunteers who helped pick up the leavings of the thoughtless, and thereby made the desert enjoyable for all.

**T**HE RAND Open Area cleanup November 1 and 2, proved to be the success that had been predicted by officials of the California Off Road Vehicle Association (CORVA), Motorcycle Owners, Riders and Enthusiasts (MORE), and the Bureau of Land Management (BLM). Over 400 eager volunteers converged on the desert over the weekend and when they were finished approxi-

mately 48 tons of cans, bottles, paper, car bodies and other debris had been gathered and trucked to the dump and nine abandoned mine shafts had been fenced.

The Naval Weapons Center, China Lake, also played a significant role in the overall success of the project. They donated five dump trucks with drivers to haul away the mountain of litter gather-





*Opposite Page: Even the youngest got into the act. Billy and Paula Maxey of Bakersfield.*

*Right: All types of special interest groups took part in the Rand cleanup.*



Prizes were given as an incentive to the participants of the cleanup. Harlow's BLM crew hid gift certificates in with much of the debris on the desert that could be refunded for valuable merchandise from commercial contributors.

"I would like to thank Stauffer Chemical of South Gate; Davis Walker of Los

Angeles; Triangle Steel and Supply of Los Angeles; Ja Mar, La Mirada; Interpart Corp., El Segundo; Lee Company, New York; Winter Industrial Co., San Diego; Beeler Wilson Honda, Lamont; Honda Motor Company, Los Angeles; Pro Tec, Pico Rivera; Modern Motors Off Road Center, Glendale; Cycle News,

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"What these wonderful volunteers realize is something that perhaps many people aren't aware of. The desert is not some kind of bleak lunar landscape. It is a living place with a profound beauty of its own, teaming with wildlife and vegetation that is missed by the casual onlooker. Perhaps that's the reason some people are so careless with their trash and garbage when they are on the desert.

"Everyone who took part in the cleanup can be justifiably proud of their efforts because, in our own way, we added to the life of the Living Desert." □

*A small portion of the 48 tons of debris collected.*





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# Rambling on Rocks

by  
**GLENN and  
MARTHA VARGAS**

## GEM SUBSTITUTES

IN PAST COLUMNS we have mentioned instances where gems have been imitated. Most of these are definitely fraudulent practices and are looked down by the gem fraternity. The practice is widespread and we will refer to it later in this column. We would like to start this discussion with the story of imitations of diamond.

Because of rarity and difficulty to produce, diamond gems have always been imitated. Much of this was fraudulent, but often the buyer was told that the stone in question was an imitation. In most of these cases, the final owner then carried out the misrepresentation to convince others that he owned a diamond.

In other cases, the owner of the imitation gem also owned the original, and wore the imitation, keeping the real gem in a vault. This we mentioned in our last column. These imitations were glass and often called paste.

Today, we have a similar situation, but the imitations are not glass. Instead,

they are one of the new synthetic gem materials that has a better resemblance to diamond. In the final analysis, glass was and is a very poor imitation of diamond.

The first of the diamond substitutes was synthetic rutile which appeared on the market about 30 years ago. Rutile is a natural mineral, but seldom ever appears in clear enough pieces to make gems. The new synthetic was called titania. One of the constituents of rutile is the element titanium, so the name titania is understandable.

Titania has a very high dispersion (the property of breaking light into the colors of the spectrum). Actually, titania does this much better than diamond. It is much softer and has a light yellow color.

The color was against titania as a diamond substitute. The lower hardness (slightly over 6) was also a deterrent. These two characteristics might have been ignored, but the much higher dispersion of titania was really too good and was characterized as a "squashed rain-bow" look. Also, titania has a high double refraction (the splitting of light rays) that diamond does not have. Thus, almost anyone could look at a titania gem and tell immediately that it was not a diamond. It quickly passed out of vogue as a substitute.

At almost the same time, another synthetic diamond substitute came on the market. With it came another alternative name for imitation — "diamond simulant." This material is strontium titanate, a material hitherto unknown in any form. This was given the name of Fabulite, and in some respects, the gem is fabulous.

Fabulite came closer to being a diamond substitute (or simulant) than did titania. It is virtually colorless, and shows no double refraction. The lack of hardness (6) and a very high dispersion (though not as great as titania) were again deterrents to its use as a diamond substitute.

Evidently the advantages outweighed the disadvantages, for the material was offered under many other names. Some of these were diamonaire, diamonlite or some other suffix to the word diamond. Many of the advertisements for these contained fraudulent claims, and a number of firms were investigated by government agencies.

Lithium metaniobate, another mater-



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ial with no natural counterpart, named Linobate, also appeared for a short time. Linobate is colorless, but is very soft and again exhibited double refraction as well as too high a dispersion.

The material that presently occupies the dubious honor of being a diamond substitute is a synthetic relative of garnet. The material chemically known as yttrium aluminum garnet, and has been given the acronym of YAG. This finally approaches the hardness of diamond with a hardness of 8-1/2. We will admit that there is a great difference between the 10 of diamond and the 8-1/2 of Yag, but under normal wearing conditions, the average person would not find much difference.

Otherwise, Yag is not very successful as a diamond substitute. It has much less brilliance, with a refractive index much lower than diamond. The problem of dispersion is now on the other side and is much less than diamond.

If we add up the characteristics that might be compared to diamond, only hardness is of any importance. Optical characters are lower than diamond, with the exception of color which nicely matches.

Yag has been given a boost as a substitute by being used to duplicate a few of the large diamonds owned by well-known people. This, however, does not really make it a good substitute any more than glass was in the past.

We are at a loss to understand the furor about a diamond substitute. Other than deception, there is no need for a substitute. Diamond is a marvelous gem. Many others feel as we do, that only a diamond can substitute for a diamond.

The part of all this that we really dislike is that each of the gems that are offered as diamond substitutes are excellent gems in their own rights. True, they may be soft, or lack something that diamond exhibits, but we do not compare other gems to diamond. Why not enjoy a gem for what it has to offer, rather than compare it to another? If these new materials were offered on their own merits, they would now occupy their own niche in the gem world.

Another sad byproduct of this substitution idea is that it is now being carried over to other gems. We have noticed some very recent ads that go further than the usual imitation. One ad extols a new glass imitation of turquoise. A

Japanese glass works now offers a simulated emerald. Those of you that have followed our recent columns know our feelings about glass being used as cheap imitations of gems.

It is certainly true that as long as we have valuable gems, we will have imitations. This has been true in the past, and we expect it in the future. We have always looked upon imitations as fraudulent attempts to give the gullible buyer something other than what he thinks it is. The new twist of offering buyers an imitation and telling him it is almost as good as the real thing might seem to be opening a new era of honesty.

We do not view it as such, but only as a crude method of trying to capture part of the gem market without offering a gem. We have seen some very clever glass imitations. In some cases, we have had real difficulty discerning them from true gems. This could only be true when the imitation is new and unused. A small amount of wear, and the glass imitation soon shows itself for the imposter that it is.

We have often observed the seller of imitation gems. First, they need to work diligently to convince the buyer that the "gem" is the real thing, or something just as good. We are very tired of the cliché, "Only a jeweler can tell." Usually, the extreme novice can easily tell it is not the real thing. Second, he is forced to offer the imitation at a price that is much lower than the real thing. Thus, we strongly doubt if he is being well paid for his efforts. We seldom see the same seller making like offerings at a later date, and can only assume that he has dropped out because of poor returns.

On the other hand, we have numerous acquaintances that are legitimate businessmen that offer good gems and gem materials at fair prices. They have been in business for long periods and are prospering. We have watched many of them take advantage of the surges in popularity of certain gems (such as the present surge of turquoise), but never stoop to dealing in imitations. If they did, we would be greatly surprised.

Perhaps there is a moral to this. If the gullible are willing to be sold an inferior product by a huckster that misrepresents his product, then the serious gem buyer should search out the dealer that offers only the real thing. True, some dealers will charge more than a good gem is

worth, but regardless, the buyer has a real gem! We are not going to approve of the dealer that sells gems at inflated prices, but at least he offers real gems.

The dealer that offers imitations, regardless of price, is overcharging to a far greater degree! □

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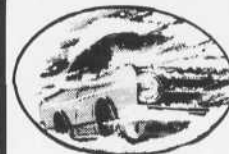
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# Letters to the Editor

Letters requesting answers must include stamped self-addressed envelope

## More on Crucible Buttons . . .

Fake green gems mentioned in the "Rambling on Rocks" column may indeed be created from assay slag among other sources.

Fire assaying creates a glass slag containing most of the minerals in the original sample. It can easily be distinguished from naturally occurring glasses because the assay fluxes contain lead oxide and sodium carbonate or bicarbonate. Thus by spectrographic analysis, a report indicating large amounts of lead and sodium indicate a man-made gem.

The green color occurs when the melted slag is low in impurities since at that point the green caused by the addition of lead and borosilicate fluxes is visible. When samples contain large amounts of iron, a red glass or black glass is produced depending on which mineral of iron is predominant. Virtually any color may be produced by the various minerals tested.

The reason such glasses become dull after awhile is that on exposure to air, the assay flux absorbs small amounts of moisture and in humid climates, the glass will feel sticky to the touch.

Such glasses also contain small lead globules, produced by "shotting" of the flux due to impurities in the ore sample.

As you can see from the enclosed slag, any color can be produced, and by eliminating or reducing several fluxes, obsidian can be virtually duplicated in color and appearance.

P. REED,  
Assayer  
Orange, California.

*Editor's Note: Mr. Reed's slag specimens are colored light green, dark green and chocolate brown. All are on display at our Book Shop.*

I have just finished reading your article in *Desert Magazine*, October, 1975, about the green crucible buttons, and with your kind permission I would like to add my two cents worth. Having been actively engaged in the mining business for 47 years, and being thoroughly familiar with all phases of mining and milling, I feel reasonably qualified to comment on the matter in hopes it may shed a little light on the subject.

To begin with, the color of the buttons depended upon several factors ranging from the type of mineral sample being assayed to the type of flux used by the assayer. While most assayers used prepared fluxes of commercial

origin, most of the old line assayers preferred to "dope it up" with other additives depending on the type of ore and the judgment of the assayer as to the right combination for the best results. As a result, the colors of the slag could range from green to black or red. Some mines produced slags of a red color and others of green or black, depending on the ore and the assayer. A commercial assayer who handled samples over a wide range of territory and many different mines and prospects could produce crucible buttons of almost any color.

For example, the Empire Mine here in the Grass Valley District produced slags of a predominantly red or brown color, while the Mountaineer Mine at Nevada City produced buttons ranging from a clear apple green to dark bottle green.

While I have never heard of the green ones referred to as "tektitics," I have had them called "Nevada County Emeralds."

JOHN A. BURTON,  
Nevada City, California.

## Green Obsidian . . .

I have read with a great deal of interest your articles in the October and November, 1975, issues of *Desert Magazine* in which you discuss glass as a substitute for gem material and from there discuss the possibility of the occurrence of green obsidian.

I agree completely with your assessment of the material you have found and that has been sent to you as not being obsidian. However, there is one well documented case of a greenish obsidian that occurs in Peru. It does not have the attractive green color of "bottle glass" or the bright green material described in your November article on page 42. However, much of the material does have a greenish cast not unlike the color of olivine (peridot); that is, it is dull, olive green color by transmitted light and is translucent in really very large pieces, up to two or three inches thick.

This material has been the subject of at least half a dozen scientific articles. At first it was thought to be tektitic in nature but a recent detailed study by Barnes, *et al.*, *Geological Society of America Bulletin*, vol. 81, pp. 1539-1546, 1970, demonstrates conclusively that the material is not tektitic. The article, as well as some previous ones, demonstrates that the material has a unique chemical composition insofar as obsidians are concerned, or any igneous rocks for that matter.

Barnes' article does not mention the color of the material. I have discussed this with Dr. Barnes and he points out that the color varies from practically colorless transparent through olive green and blueish green to a dark brown. He did not feel that any of the colors was characteristic. Dr. Fred Bullard, also of the University of Texas at Austin, has collected the material and his impression is that it is predominantly green. One of Barnes' co-authors on the paper determined the age of the material by the well known potassium/argon method and it turns out to be Pliocene in age, which is the age of much of the volcanic material in the Andean region. This demon-

# Calendar of Events

This column is a public service and there is no charge for listing your event or meeting—so take advantage of the space by sending in your announcement. We must receive the information at least three months prior to the event.

JANUARY 15 through Season, Living Desert Reserve, Palm Desert, California, Special Programs on different aspects of the Natural History of the Deserts, Monday and Wednesday nights at 7:30 PM. Guided Nature Walks every Saturday at 9 AM and Sunday at 3:30 PM. Call 714-346-6555 for details.

JANUARY 18, Sylmar Gem Dandies Gem and Mineral Club "Showoff of 1976." Masonic Temple, 1112 N. Maclay, San Fernando, California. Free parking, admission and demonstrations. Food, dealers.

JANUARY 31-FEBRUARY 1, California Barbed Wire Collectors Association's Antique Barbed Wire and Collectable Show at the Colonial Country Club, 25115 Kirby at Menlo, Hemet, California. Barbed wire, fencing tools, bottles, insulators, date nails and more. Free. Write: Amos Ulberg, 21100 Highway 79, Space 309, San Jacinto, California 92383.

JANUARY 31-FEBRUARY 1, Orange Coast Mineral & Lapidary Society's 26th Annual Show, National Guard Armory, 612 E. Warner, Santa Ana, Calif. Dealer space filled. Free admission and parking. Outstanding exhibits.

JANUARY 31-FEBRUARY 1, The Spirits of 76 in Glass, sponsored by the Southern Nevada Antique Bottle Collectors, 11th Annual Bottle Show and Sale, Convention Center, Las Vegas, Nevada. Contact: Karen Perraro, 515 Northridge Dr., Boulder City, Nevada 89005.

strates conclusively, of course, that the material cannot be artificial because if it had been melted up by man its K/Ar age would have been zero, instead of seven million years or so.

Under separate cover I am sending a small piece of the greenish obsidian.

EARL INGERSON,  
University of Texas  
Austin, Texas.

*Editor's Note: We wish to thank Mr. Ingerson for sending the above green specimen, and it is on display at our Book Shop.*



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